

AUTOMOTIVE INDUSTRIES

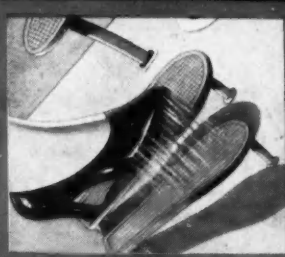
LAND AIR WATER

Volume 68
Number 17

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PHILADELPHIA, APRIL 29, 1933

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In a flash



foot rotates
from accelerator
to this *low* brake
pedal

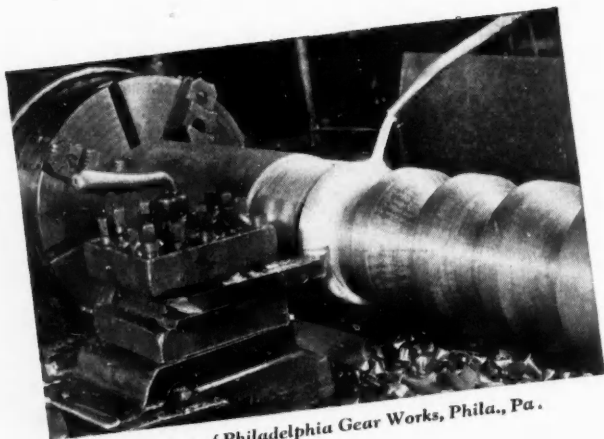
... another of the many reasons why

STEWART WARNER

Automatic

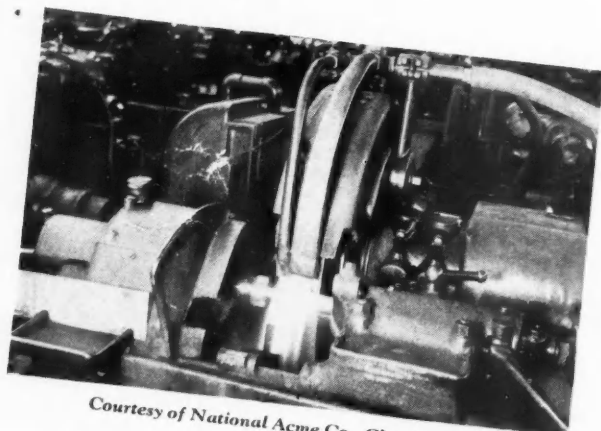
FULL POWER BRAKES

**will do more to boost car sales
than any other feature!**



Courtesy of Philadelphia Gear Works, Phila., Pa.

OPERATION: TURNING GEAR BLANK.
MACHINE: LIBBY LATHE.
MATERIAL: STEEL FORGING.
CUT: 7/8 INCH; **FEED:** 1/32 INCH.
LUBRICANT: 1 PART SUNOCO TO 15 PARTS WATER.



Courtesy of National Acme Co., Cleveland, O.

OPERATION: GRINDING TWO DIAMETERS.
MACHINE: BROWN & SHARPE NO. 30.
MATERIAL: TYPE EE STEEL FORGING.
WHEEL: 30 X 28 X 4 INCHES, R. P. M. 900.
COOLANT: 1 PART SUNOCO TO 40 PARTS WATER.

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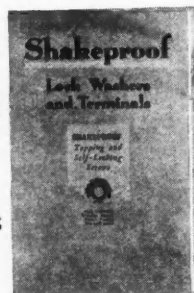
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April 29, 1933

Automotive Industries

AUTOMOTIVE INDUSTRIES

the **AUTOMOBILE**

Volume 68

Reg. U. S. Pat. Off.

Number 17

JULIAN CHASE, Directing Editor

DON BLANCHARD, Editor

P. M. HELDT, Engineering Editor JEROME H. FARRIS, Ass't Editor
 JOSEPH GESCHELIN, Eng. Editor ATHEL P. DENHAM, Field Editor
 GEOFFREY GRIER, Art Editor

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 J. S. HILDRETH, Vice-Pres. and Director of Sales
 W. I. RALPH, Vice-Pres. G. C. BUZBY, Vice-Pres.
 A. H. VAUX, Secretary and Treasurer
 JOHN A. CLEMENTS, Asst. Treasurer
 GEO. D. ROBERTS, Advertising Manager

Cable Address.....Autoind. Philadelphia
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OFFICES

New York—U. P. C. Bldg., 239 W. 39th St., Phone Pennsylvania 6-0080
 Chicago—867 West Adams St., Phone Randolph 9448
 Detroit—710 Stephenson Bldg., Phone Madison 2090
 Cleveland—1140 Guardian Bldg., Phone Main 6860
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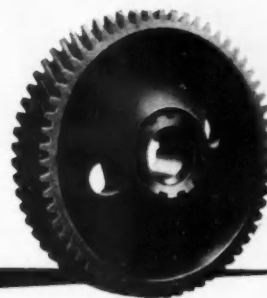
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Automotive Industries



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The use of a Textolite timing gear is a token of good manufacture throughout the car.



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GENERAL ELECTRIC

April 29, 1933

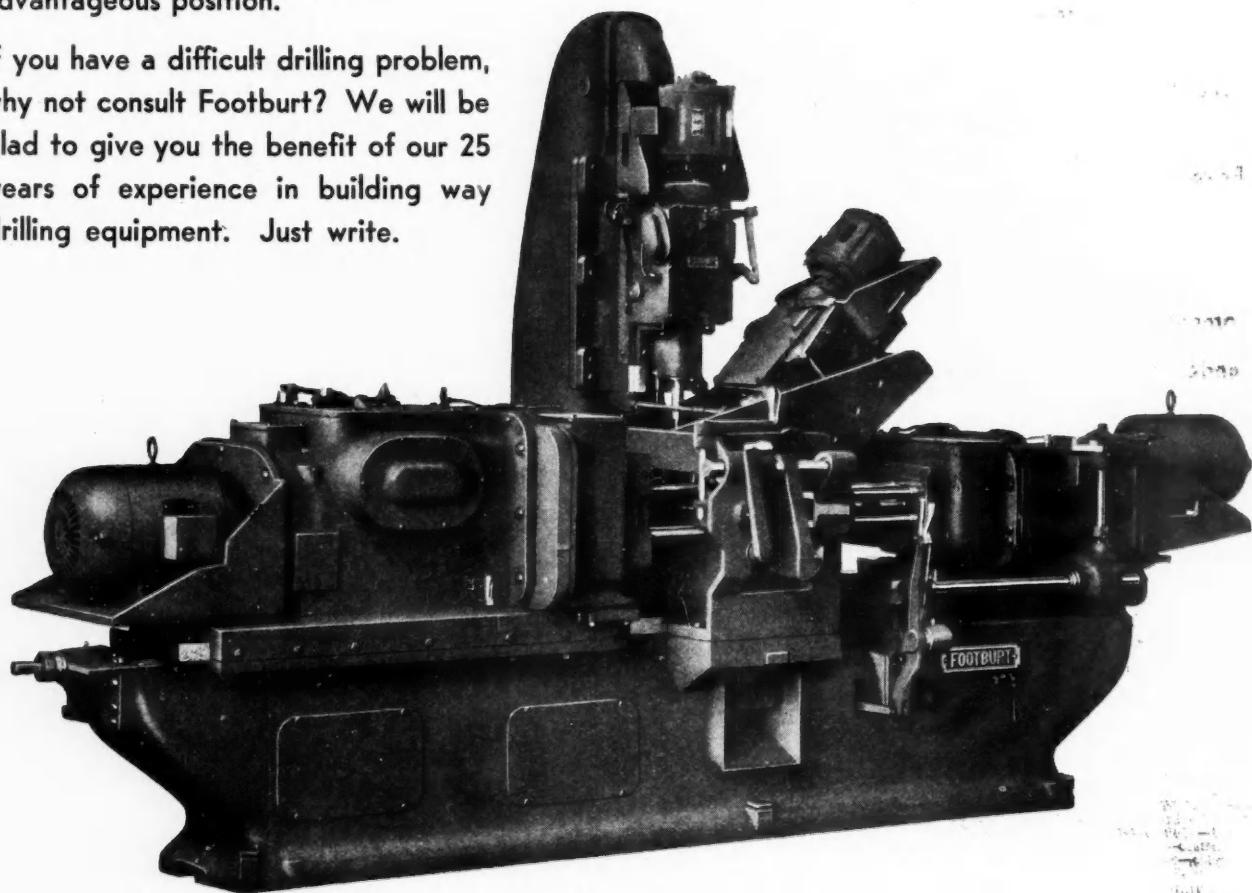
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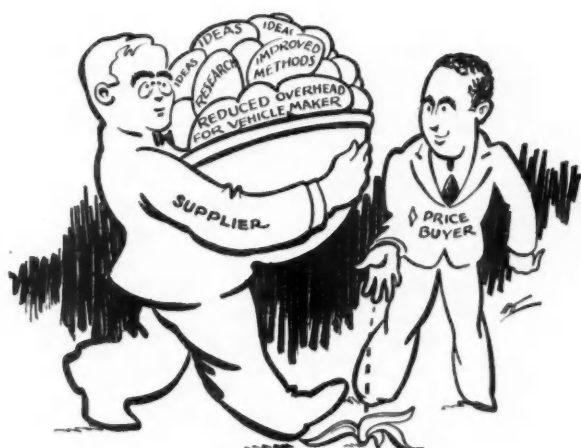
Chicago Office: 565 Washington Boulevard

April 29, 1933

Automotive Industries

WHAT WE OWE TO SUPPLIERS

Do we owe them, and ourselves
as well, a new deal in buying?



Is It Worth the Chance?

by Julian Chase

Directing Editor,
Chilton Co.

and safety and have brought these contributions to the complete vehicle manufacturers in such quantities and qualities that they may be incorporated into the finished product at costs which make for lower final prices and—up to a certain point—greatly widened markets.

What the engineers and others in the complete vehicle plants have done, for the most part, is the important, the indispensable work of selection, adaptation, refinement and coordination. With the enormity of that task they have been chiefly occupied and the close approach to perfection which has been attained in the finished job is a glorious and gratifying testimonial to their intelligence and skill.

Perhaps no one will deny that this, considered only as a general-

IF the history of automotive development is a sound foundation for the belief, it can safely be asserted that a curtailment of interest in the progress of automotive design on the part of those who are and have been our parts, accessory, materials and plant equipment suppliers would be most unfortunate if not calamitous for the industry.

The automobile of today, in almost all of its essential and desirable elements individually, is the product of the contributing manufacturers. It is made up of the results of their ingenuity, inventiveness, research, experimenting, vision, courage and natural and commendable desire for profits and wealth. It is they who have made available the things which, to a prepondering extent, provide the safety, comfort, ease and consistency of operation, the durability and

extraordinary performance which are characteristic of today's automobile. It is they who have improved the design of most of the original elements and have developed the superior materials from which they are made. It is they who have introduced new ideas which give increased comfort, convenience

THE most important contributions of the supplying manufacturers are not the things which they ship by motor trucks and freight cars. They are, instead, the ideas for improved performance and better manufacturing processes which grow out of specialized thinking and effort, out of the dollars, time and brain energy consumed in the plants of these manufacturers.

BY the blending of experience, the swapping of ideas and the encouragement of cooperation, the expense of research and development work and the burdens of overhead are spread, costs kept down, invention stimulated and progress expedited.

ization, is a fair and comprehensive statement of the case. If anyone should doubt it, it is safe to say that he is not one of those whose intimate knowledge of the advance of automotive design goes back to the days when cylinder castings were made with a grain structure approaching the coarseness of that of a drinking fountain for horses, when frames were made of bicycle tubing, when transmission gears either mashed or chipped after a few shiftings, when ignition systems were mostly of the make and break type with dry cells as a source of current and brakes were simple bands with leather linings. Certainly he does not date back to the still earlier period when some pioneers, at least, found it necessary or desirable even to form up the plates of the storage batteries which they hoped would provide sufficient EMF to propel the crude materializations of their dreams.

The ingenious and enterprising mechanics who started the things which, in the late nineties and early nineteen hundreds, resulted in the real beginning of the automotive industry, had their ideas and visions but nothing with which to work them out except the materials of the stove foundry, blacksmith shop and bicycle factory. They struggled with their problems which were practically all-inclusive. There was no one to provide the materials they needed. They, themselves, did not know what these materials should be. They could not have written the specifications if they had tried. There was no one to hand them steering knuckles or axles or crankshafts or radiators or universal joints or even proper anti-friction bearings. They worked alone.

From the patterns which they made they took the rough and inadequate castings that the local and relatively unenlightened foundry man turned out. With the aid of the blacksmith's forge, the engine lathe, the shaper, the milling machine, the single spindle upright drill, cold chisel, file and emory cloth, they fashioned and finished

almost all of the parts they used. But they worked on persistently and courageously and the results of their efforts attracted the attention of those who, with secondary or incidental interests, saw opportunities for themselves. That was the beginning of the parts, accessory and automotive material business.

While the early automobile builder was struggling to make his engine give him the power he needed and hoped to get, someone came along and showed him a tire which was better than those of the hose-pipe variety which he had hitherto been forced to use. Later he was handed the removable rim, and still later, the metal and demountable wheel. While he was working on the problem of laying out his assembly to get some degree of efficiency and accessibility, someone offered him a complete ignition system much superior to the one which he had devised. Someone else said "Here's a radiator," another, "Here's a frame," still another, "Here's a brake." A salesman from a material fabricating plant called and told him that

THE automobile of today, in almost all of its essential and desirable elements, taken individually, is the product of the contributing manufacturers.

now he could get more strength for this or that part with much less weight—greater toughness and longer wear.

And then the flood gates of invention were opened and our automobile builder was swamped. Carburetors, mufflers, clutches, universal joints, tops and windshields, engine valves, pistons, transmissions, fans, fuel-feed systems, self-starters, electric lights, closed bodies, steel bodies, alloy steels, bearings, rear axles, air cleaners, steering gears, front end drives, shackles, lacquers, chrome plating,

shock absorbers, brakelining, power brakes; oil filters, free wheeling, safety glass and what not were poured upon him. For his shop he was offered multiple spindle, automatic, high production machines, conveyers, ovens and furnaces, high-speed cutting tools and a long list of other things which reduced his costs and increased his output. We make no effort either to name all of the things which came to him or to set them down in the order of their appearance.

Where there was and is one shop turning out complete automobiles, there were and are many in which specialized ability and experience, work, worry and wealth are turned into things which make automobiles better. The acceptance by the automobile makers of the new ideas so generated was at first avid. They were needed to effect a greatly desired runability and dependability. Then there was a period of hesitancy which resulted from the fact that the demand from the would-be motorist for anything that would run was so great that hardly more than runability was required in order to make sales. Such things as self-starters, closed bodies, electric lights, shock absorbers and most of the comfort and convenience providing accessories had to work their way into the list of items of regular equipment through the so-called after-market. It was through the purchase and use of these devices that automobile owners set up new standards and higher expectations of motor veh-

icle performance with the result that car manufacturers adopted and adapted them gradually and thereby increased the number and effectiveness of their selling arguments.

And so it has gone right up to the present day—right up to the 1933 models. So it will go in the years to come, with the men in the complete vehicle plants supplemented by the men in the plants which produce parts, accessories, materials and production equipment. By the exchanging of experience, the swapping of ideas and the encouragement of cooperation,

the expense of research and development experimentation and the burdens of overhead may be spread, costs kept down, invention stimulated and progress expedited. So it will go if the live-and-let-live principle is given the value it must have to meet the new conditions of tomorrow.

The most important contributions of the supplying manufacturers are not the things which they ship to the complete vehicle makers by motor trucks or freight cars. They are instead, the ideas for improved performance, for better manufacturing processes which grow out of specialized thinking and effort, out of the dollars, time

This resentment stimulates a line of thought from which the conclusion to be drawn is that it is not only better not to have too many eggs in one basket but far better to do a smaller volume of business, if that is the alternative, at something that can be called a profit.

It is not only a bearing down on prices—of chiseling, if you will—which creates this growing resentment. What are regarded as arbitrary, unfair and high-handed methods in many of the elements of the buyer and seller relationship have an equal influence. Of chiseling it may be said with a large measure of truth, that the suppliers among themselves are as much re-

parts makers worth encouragement?

In the relatively recent history of the industry it is recorded that the attitude of the car manufacturer toward the dealer's acceptance of cars shipped to him on an arbitrary quota basis had to be, or was, modified in its application at least. It was found that the control of production in accordance, to some extent, with sales not only materially aided the dealer, but what is more important in this discussion, even more definitely helped the manufacturer. Would not a modified, more cooperative policy with regard to the purchasing of parts, accessories, materials and production equipment be likely to yield results equally advantageous? Would it not be worth while, at the same time that the buyer and seller relation, as it applies to products contributed by outside manufacturers, is being brought to a state of greater healthfulness, to consider the further elimination and writing off of subsidized departments which, under open-eyed bookkeeping, cannot compete with specialized plants that share the overhead on the parts produced during production peaks and assume it all when things are slack?

The automotive industry has its part to play in bringing about the new order of things, economic and social, which is as inevitable as the rising sun. We are threatened with such measures as the Perkins Bill, unemployment insurance and many other forms of governmental regulation and control, and that's only a small part of it. We shall subject ourselves to such control in the future just to the extent that we show ourselves incapable of managing our own affairs, of solving those problems of our own industry which, remaining unsolved, affect the general welfare. For selfish reasons we can well afford to consider seriously and do something about our buying practices. More than at any other time since the industry began, they have a harmful influence on the entire economic and social structure and to the same extent, of course, on our industry.

Measured by the value—the real value—of their contributions to the development of our product, measured by their capacity to restore buying power, measured in almost any way, the importance of the supplying manufacturers is such that they must live and prosper if the industry as a whole, and each of its units individually, is to live, progress and thrive. Don't we need a new deal in buying?

SHOULD there not be a further elimination and writing off of subsidized departments which, under open-eyed bookkeeping, cannot compete with specialized plants?

and brain energy consumed in the engineering departments, the experimental laboratories and the conference rooms of these manufacturers. With thousands of trained minds segregated into hundreds of groups, each group devoting its attention to some particular problem, progress is tremendously accelerated and things otherwise undreamed of become profit-making realities. If the history of the advance of automotive design is any criterion, it would be a calamity if the interest of those who have contributed so much should wane. But how can they continue to contribute if they do not make money as a result of their efforts? What inspiration is there for them without adequate profits?

Should anyone ask if there is any evidence of a waning interest, let him know that there is. It would take only a superficial investigation on the part of an impartial observer to discover proof of the assertion. A tour of the plants in which automotive parts, accessories, raw and semi-fabricated materials and production equipment are or have been made would soon uncover an increasing disposition to cultivate other fields than the automotive. And this tendency, where it is discovered, would be found to be only in a relatively small measure due to the present inactivity in automobile production. There is a growing resentment against the buying practices of the industry.

sponsible for it as the men who do the buying for the complete vehicle plants. But that certainly is not true of the other practices which are today actually working against instead of for those who employ them.

A typical expression of the feeling of a large part of the supplying industry is that of a man well known within the industry which was contained in his letter printed in the April 15th issue of *Automotive Industries*. It is most conservative and moderate as such expressions go. Said he:

"I have felt for a long time that sooner or later the car manufacturers would feel the reaction caused by the very severe conditions which they have imposed on the parts maker, and indeed some of the practices which have been resorted to by the very prominent car manufacturers are almost startling when it is realized that this is really a respectable business."

It would be short-sighted and suicidal to accept such statements as merely the outbursts of soreheads. They are too numerous and they come too frequently from dispassionate, hard-headed men of business who have had a wide range of experience in other fields.

With a decrease in desire to do business with automotive manufacturers comes also a decrease in the creative thinking which would benefit the automotive manufacturer in the future as it has in the past. Isn't life-giving cooperation of

JUST AMONG OURSELVES

Canadian Optimist

JUST returned from three days in Canada yesterday where we found automotive business conditions much like those down here in the States—showing signs of improvement. Various executives to whom we talked were hopeful that the turn had come, but conservative in the making of predictions.

Most interesting of individual comments, perhaps, came from Canada's most colorful automotive figure, R. S. McLaughlin, head of General Motors' operations there, who has been conservative almost to the point of pessimism about the outlook for some while back. But he's feeling more hopeful now than he has for some time, if we interpret correctly the informal comments he made. There is an outside chance, Mr. McLaughlin thinks, of G. M. Canadian sales for the first six months of 1933 reaching the totals achieved in the first half of 1932, although he thinks a slight decrease likely. He feels sure that the last six months of this year will go ahead of the last six of 1932 so far as Canadian sales are concerned.

Ontario Sales Up

J. L. STEWART, Canadian Automobile Chamber of Commerce general manager, sees encouragement in the fact that Ontario sales in March, this year, topped those of March, 1932, by 6.2 per cent, despite the fact that totals in other

provinces continue to run behind 1932.

Trends in Ontario are specially important because in that one province approximately 47 per cent of all the motor vehicles in Canada are registered.

Cold to Reciprocity

FOUND Canadian executives much interested in the talked of reciprocity agreements between United States and Canada but loathe to discuss in too much detail at this time possible effects.

The Canadian motor industry in general, we think, will not greet with loud cheers too much reciprocity. It is our guess that it will be found again, as in the past, asking the Canadian government to weigh the ill-effects on Canadian automotive employment and purchases which would come from anything like complete reciprocity against the possible advantages of lower vehicle prices for cars sold in Canada.

Having made only a three-stop survey on the matter, however, we shan't pretend to be in a position at the moment to speak with any authority on what may happen.

An Education in Research

ONE of the major disappointments of our brief sojourn in Canada, incidentally was our failure to find at home Roy D.

Kerby, enthusiastic president of Dominion Motors, Ltd.

We did have an interesting chat with T. K. Jones, vice-president of Willys-Overland, Ltd., and learned that this company had increased its percentage of total Canadian sales this spring despite W-O difficulties in the States.

And we learned so many important and vitally interesting things about practical adventures in consumer research from H. A. Brown, vice-president and general manager of General Motors that we will just have to reserve space in a future issue to even start telling about them.

Engineers' Thinking Quickens

OUR Canadian visit came about, incidentally, largely because of an invitation to speak at meetings of the Buffalo and Canadian sections of the S.A.E.

Contact with these two groups, together with reports coming through from President Dickinson and General Manager John Warner who have just completed a trip to the Coast during which they contacted eleven sections, brings strongly in focus again the increased activity in thought and cooperative work which has taken place among engineers during the depression.

Meetings of many sections have had larger attendances on the average than last year; interest in cooperative effort has increased rather than decreased despite heavier duties loaded on individual engineers; and evidence grows of the increased vitality of technical thinking and coordination throughout the industry.—N. G. S.

1932 Statements Show Need for Moderate Car Price Increases

Analysis indicates that no probable gain in volume will be sufficient materially to reduce industry's losses below 1932's deficit of \$100,000,000.

AT 1932 prices, car and truck manufacturers lost in round numbers \$100,000,000. What their losses will be this year, unless 1933's even lower prices are advanced or a substantial increase in volume comes to the rescue, can only be conjectured. But reports so far available for the first quarter indicate that the industry is headed for an even larger deficit.

While shrunken volume unquestionably is primarily responsible

for this unsatisfactory situation, analysis of the financial statements of a group of important companies indicates that the steady downward trend of selling prices has been a factor of more than passing importance. Moreover, the evidence

by Don Blanchard
Editor, Automotive Industries

points to the conclusion that a moderate increase in prices may hold more hope for improving the situation than any probable increase in volume. Such an increase is both desirable and justified, leaving monetary inflation out of the picture entirely.

Last year eleven companies and their subsidiaries—Auburn, Chrysler, General Motors, Hudson, Hupp, Mack, Nash, Packard, Reo, Studebaker and White—obtained 68 per cent of domestic unit volume and their combined sales totaled \$732,-

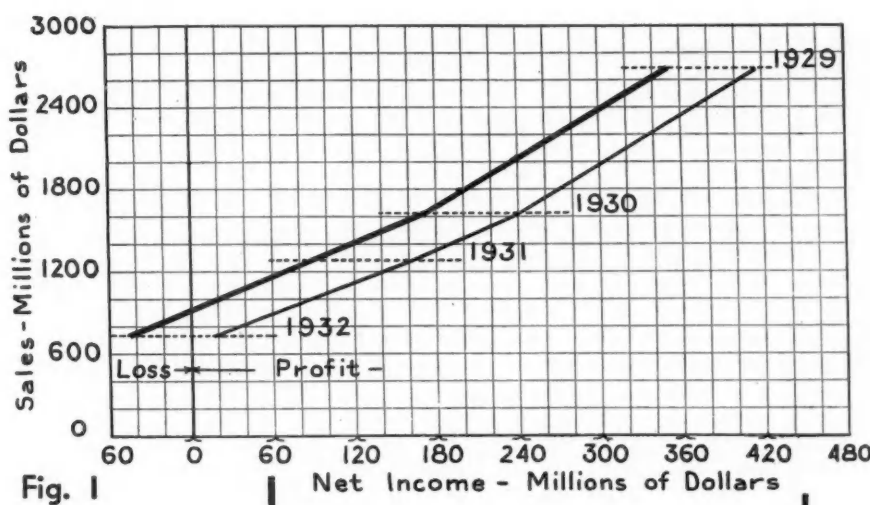
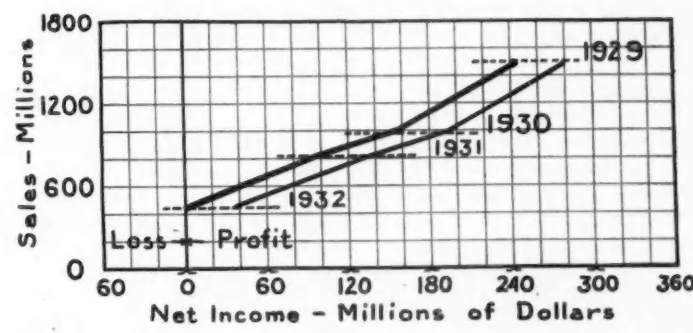
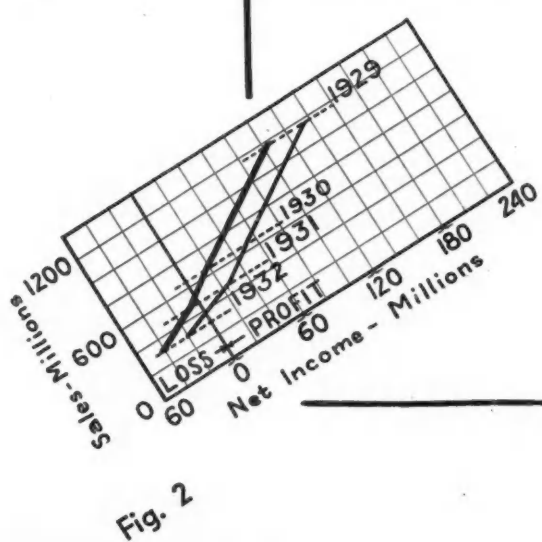


Fig. 1—Sales plotted against net income or loss for 11 companies which in 1932 obtained 68 per cent of domestic car and truck volume. The upper curve shows net income after depreciation and the lower before depreciation

Fig. 2—The same as Fig. 1 except that the data are for 10 companies exclusive of General Motors

Fig. 3—The same as Fig. 1 except that data used are for General Motors only



	Total—10 Companies				General Motors			
	1929	1930	1931	1932	1929	1930	1931	1932
Unit Sales — U. S.								
Retail	1,012	552	483	349	1,491	1,048	937	522
Per cent of 1929	100	55	48	34	100	70	63	35
Per Cent of Total Sales	22	18	22	27	33	34	42	41
Dollar Sales*	\$1,183,845	\$637,065	\$473,131	\$300,517	\$1,504,404	\$983,375	\$808,841	\$432,312
Per Cent of 1929	100	54	40	25	100	65	54	29
Net Income after Depreciation, Interest and Taxes	\$105,575	\$17,834	†\$7,448	†\$44,225	\$245,970	\$153,766	\$96,877	\$165
Per Cent of Sales	9	3	†2	†15	16	16	12
Preferred Dividends	\$851	\$922	\$460	\$421	\$9,354	\$9,473	\$9,376	\$9,206
Common Dividends	\$76,005	\$58,598	\$28,295	\$13,709	\$156,600	\$130,500	\$130,500	\$53,993
Total Dividends	\$76,856	\$59,520	\$28,755	\$14,130	\$165,954	\$139,973	\$139,876	\$63,199
Per Cent of 1929	100	77	37	18	100	84	84	38
Balance to Surplus after Dividends, Charges, etc.	\$29,070	†\$43,504	†\$42,737	†\$61,385	\$79,892	\$13,728	†\$42,999	†\$63,035
Current Assets	\$384,168	\$316,586	\$280,023	\$219,547	\$368,961	\$364,817	\$358,503	\$283,259
Current Liabilities	\$78,190	\$49,602	\$42,417	\$37,438	\$117,673	\$83,780	\$84,587	\$57,822
Working Capital	\$305,980	\$266,984	\$237,606	\$182,108	\$251,288	\$281,038	\$273,916	\$225,437
Per Cent of 1929	100	87	78	60	100	112	109	90
Cash	\$83,179	\$78,001	\$69,354	\$71,863	\$101,086	\$145,714	\$119,842	\$151,153
Securities	\$72,063	\$77,753	\$87,601	\$56,287	\$26,266	\$33,323	\$85,187	\$21,628
Cash and Securities	\$155,242	\$155,754	\$156,955	\$128,150	\$127,352	\$179,037	\$205,029	\$172,781
Per Cent of 1929	100	100	101	82	100	140	161	135
Per Cent of Working Capital	51	58	66	70	51	64	75	77
Inventories	\$159,680	\$112,102	\$85,526	\$64,815	\$188,473	\$136,299	\$106,471	\$75,479
Per Cent of 1929	100	70	54	41	100	72	57	40
Per Cent of Sales	13	18	18	21	13	14	13	17
Plant and Property —Depreciated	\$287,319	\$266,852	\$245,321	\$218,971	\$415,785	\$395,374	\$362,628	\$328,274
Per Cent of 1929	100	93	85	77	100	95	87	79
Per Cent of Sales	24	42	52	73	28	40	45	76
Depreciation Reserve	\$140,733	\$152,520	\$169,542	\$172,010	\$194,095	\$218,656	\$241,473	\$171,708
Depreciation**	\$29,415	\$30,340	\$30,411	\$21,688	\$35,217	\$37,715	\$37,966	\$37,174
Per Cent of 1929	100	103	103	74	100	107	108	106
Funded Debt—Bonds, Debentures, Mortgage, etc.	\$52,865	\$50,351	\$46,926	\$59,096	\$1,992			
Capital Stock	\$337,559	\$335,687	\$322,991	\$191,705	\$571,924	\$622,537	\$622,537	\$622,537
Surplus	\$270,865	\$218,332	\$178,336	\$164,918	\$380,560	\$344,265	\$301,266	\$238,232
Capital and Surplus	\$608,424	\$554,019	\$501,327	\$356,623	\$952,484	\$966,802	\$923,803	\$860,769
Good Will, etc.	\$52,634	\$52,634	\$52,634	\$7,827	\$50,680	\$51,949	\$51,939	\$51,839
Capital and Surplus less Good Will, etc.	\$555,790	\$501,385	\$448,693	\$348,796	\$901,804	\$914,853	\$871,864	\$808,930
Per Cent of 1929	100	90	81	63	100	101	97	90
Per Cent—Net Income	19	4	†2	†13	27	17	11

* Includes estimates for Nash in 1929 and 1930 and for Hupp in 1931. These estimates may be and probably are rather far off the mark. However, any errors in them, probably, are not large enough to affect the totals for the group of companies materially.

** Does not include Nash and White.

† Deficit.

All figures in this tabulation, except percentages, have 000 omitted.

Total—11 Companies

1929	1930	1931	1932
2,503	1,600	1,420	871
100	64	57	35
55	52	64	68
\$2,688,249	\$1,620,440	\$1,281,972	\$732,829
100	60	48	27
\$351,545	\$171,600	\$89,427	†\$44,060
13	11	7	†6
\$10,205	\$10,395	\$9,836	\$9,627
\$232,605	\$189,098	\$158,795	\$67,702
\$242,810	\$199,493	\$168,631	\$77,329
100	82	69	32
\$108,962	†\$29,776	†\$85,736	†\$124,420
\$753,129	\$681,403	\$638,526	\$502,806
\$195,863	\$133,382	\$127,004	\$95,260
\$557,268	\$548,022	\$511,522	\$407,545
100	98	92	73
\$184,265	\$223,715	\$189,196	\$223,016
\$98,329	\$111,076	\$172,788	\$77,915
\$282,594	\$334,791	\$361,984	\$300,931
100	118	128	106
51	61	71	74
\$348,153	\$248,401	\$191,997	\$140,294
100	71	55	40
13	16	15	19
\$703,104	\$662,226	\$607,949	\$547,245
100	93	87	78
26	41	47	75
\$334,828	\$371,176	\$411,015	\$343,718
\$64,632	\$68,055	\$68,377	\$58,862
100	105	106	91
\$54,857	\$50,351	\$46,926	\$59,096
\$909,483	\$958,224	\$945,528	\$814,242
\$651,425	\$562,597	\$479,602	\$403,150
\$1,560,908	\$1,520,821	\$1,425,130	\$1,217,392
\$103,314	\$104,583	\$104,573	\$59,666
\$1,457,594	\$1,416,238	\$1,320,557	\$1,157,726
100	97	91	79
24	12	7	†4

The
Four-
Year
Record

The group of 10 companies consists of Auburn, Chrysler, Hudson, Hupp, Mack, Nash, Packard, Reo, Studebaker and White

829,000. They showed a combined deficit of \$44,060,000 after depreciation. Their sales therefore cost them \$776,889,000. To bring them to the break-even point on the same physical volume, their 1932 prices would have to have been about 6 per cent larger.

Of course, a price increase of this order almost certainly would have had some adverse effect on volume—how much can only be guessed. These simple calculations consequently are made not to prove that 1932 prices should have been 6 per cent higher, but merely to show how large an increase would have been necessary for the group to break even.

In Fig. 1, the sales in dollars of this group of companies during the last four years are plotted against the corresponding profits and losses of the group. Although it is dangerous to draw conclusions from a chart of this character, the point at which the upper curve crosses the zero line perhaps gives a qualitative indication of about what dollar volume the group would have to obtain to get out of the red.

The increase apparently needed is so large that unless the administration's inflationary program has some miraculous effects, it appears to be entirely out of the question this year. Consequently, the evidence tends to support the view that a moderate increase in prices would be more effective in reducing the unbalance between income and outgo than any probable increase in volume. Under existing laws, of course, any agreement on prices is illegal. But it is to be hoped that the facts will appeal strongly enough to individual manufacturers to result in a general advance in prices, entirely aside from any increases made necessary by inflation.

Obviously there is no absolute proof that higher prices would not result in a decline in sales that would more than offset the higher income per unit sold. About all that can be said to refute such a contention is that four years of falling prices have not brought the sales decline to a halt. In addition, it may be questioned whether those who are buying cars this year would be deterred from so doing by moderately higher prices.

General Motors bulks so large in the foregoing picture that it will perhaps be more illuminating to treat it separately. Each of the other ten companies also presents an individual problem, but for brevity they will be treated as a group.

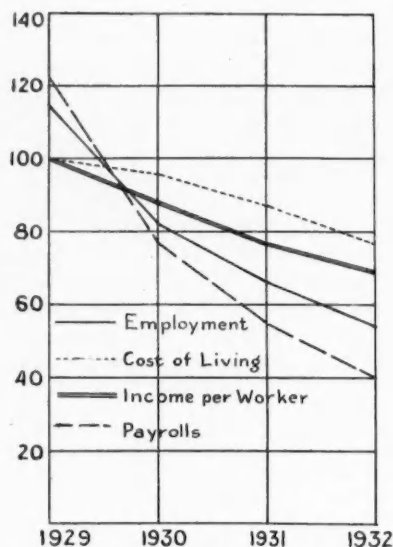


Fig. 4—The income of the individual automotive worker has decreased more than the cost of living

The ten companies (excluding General Motors) showed a consolidated net loss last year of \$44,225,000 on sales of \$300,517,000 which represented 27 per cent of domestic unit volume. On the basis of these volume-profit figures, their prices would have to have been about 15 per cent higher than they were to get them out of the red. As Fig. 2 indicates, with no change in prices, really substantial increases in volume apparently would have been necessary to accomplish the same result.

General Motors, with a net income of \$165,000 last year, operated substantially at the break-even point. Inasmuch as its depreciation charge this year will be approximately \$7,000,000 less than in 1932*, its break-even point in 1933 for that reason alone is materially lower.

This group of companies, together with Ford, account for more than 90 per cent of last year's volume, and consequently their financial results are representative of the industry as a whole. Unfortunately no indication of what Ford's 1932 losses were is yet available but, in view of the sharp shrinkage in his volume, it seems doubtful that they were less than in 1931 when the reduction in his company's surplus account amounted to more than \$52,000,000. Consequently \$100,000,000 seems like a conservative estimate of what it cost the industry to produce 1,432,000 cars and trucks last

year. Dividing the loss by the output, the average loss per vehicle produced is \$70. This average loss is a measure of the bargains the industry offered last year. Judging by the sales figures, the public didn't appreciate just what they could get for their money.

Turning now from the question of expanding income to that of reducing outgo, it does not appear that much can be accomplished in this direction to improve the industry's financial position. It is fair to presume that expenses now are at rock bottom. In view of the inflationary program, materials are more likely to cost more than less. In addition, it now appears certain that some federal legislation limiting the maximum number of hours per week and incorporating a minimum wage feature, will be passed and it will operate to increase costs.

Nor can labor be deflated further. Fig. 4 indicates that income per automotive worker already has decreased more than the cost of living and incipient labor troubles in Detroit early this year suggest that the resistance point has been reached. In fact, if we are in for an era of rising prices, the wage trend probably will be upward.

Some perhaps will say that sur-

plus plant capacity should be written off, thus reducing certain fixed items. The wisdom of drastic steps of this character, however, is open to serious question during a period of rapid change such as the present. Moreover, the industry has made generous provision for depreciation during the last three years so that for the 11 companies considered here the combined plant and property account is 22 per cent less than in 1929. For General Motors it is 21 per cent less and for the other 10 companies 23 per cent less. Unless the historical method is to be displaced by the cost of reproduction less depreciation theory, which means yearly adjustment to the price level, the industry's handling of its plant and property account does not appear to be open to very serious criticism.

Other changes in the industry's financial position—dividends paid, working capital, cash and equivalent, inventories, net worth, etc.—are given in comparative form for the last four years in the accompanying table for 10 companies, for General Motors and for the 11 companies.

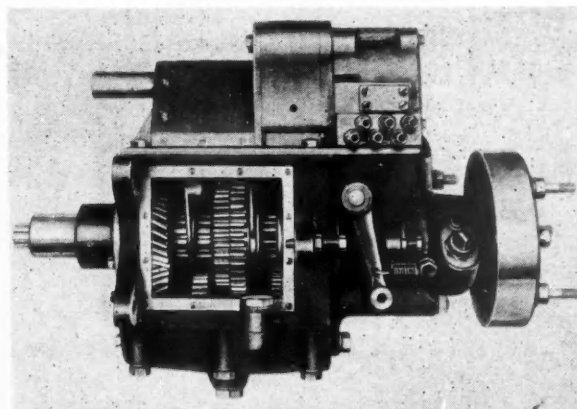
Detail data similar to that provided for General Motors for each of the 10 companies individually will appear in an early issue.

German Vacuum Shift Is Easily Installed

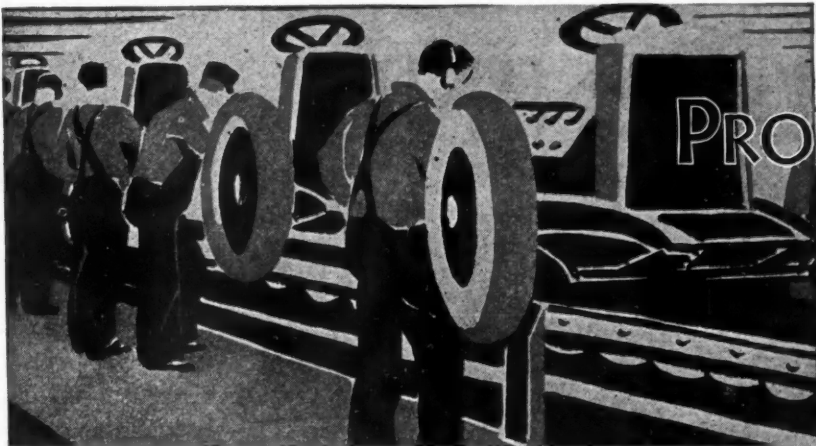
A POWER gear-shifting system making use of the vacuum in the inlet manifold of the engine has been developed in Germany and has been placed on the market by the Knorr Brake Company under the name of the Anhalt-Jander system. It can be applied to any ordinary transmission without making any changes in same. A preselecting lever is located at the center of the steering wheel, and the vacuum con-

trol valve is placed at the bottom of the steering post, so it can be operated directly through the shaft of the preselecting lever, eliminating a control linkage. An interesting feature of the mechanism is that all of the speeds, including the reverse, are obtained by means of a single vacuum cylinder. The shifting mechanism itself is enclosed in a housing which serves as cover for the transmission case.

Anhalt-Jander vacuum gear-shifting system applied to Friedrichshafen transmission



*Automotive Industries, April 1, 1933, page 418.



PRODUCTION LINES

TID-BITS and COMMENTS

from the Annual Conference of the American Management Association, Cleveland, April 13 and 14

Simplifies Study

After a new design is completed, the question of setting up on so many different types of machines and on so many different jobs, makes the study and analysis of set-up time rather a complex affair. It can be simplified, however, by the use of the Chronolog, a new instrument designed to analyze the causes of idle time in the shop. This will give the superintendent and manager of the plant a detailed record of every idle minute in the course of the day, including the time required to set up the job. When set-up time becomes excessive, the Chronolog record gives much specific information that it is possible for the shop to take positive and constructive action to reduce the set-up time on the next order.—Tell Berna, National Acme Co.

Cut Indirect

It seems hardly necessary to note that as direct costs go down, indirect costs tend to become a larger portion of total cost. Largely contributing to this trend is the addition or maintenance of staff functions, such as technical research, industrial engineering, market research, and so on. There is no question that such expenditures directed toward lower cost levels and product and method improvement have frequently been enormously profitable. Nor can it be doubted that some form of research work is necessary as insurance against obsolescence of product and procedure in any company. There is,

however, a danger of diminishing or at least variable returns from work of this sort; certainly, there is a necessity that management should know not alone what its staff or service departments cost, but from what sources and in what amounts it is getting and expects to get a return on the investment.—John Paul Jones, Standard Oil Co. of Indiana.

Product Control

At present, there is a very definite trend toward product control rather than process control. Process control means the separation of the various operations and grouping those involving similar operations and processes into separate departments. On the other hand, in a plant set up for product control, the equipment actually required to perform the operation on a particular product or a similar line of products is set up in the correct sequence, and the product transported as little as possible. This is really making small plants within large ones. To meet the competition of the smaller plant, many of which have been outstandingly successful through the depression, the large plant is being forced to this realization.—Allan H. Mogensen, Industrial Consultant.

Cut Set-up Time

Foremen, stimulated through proper incentives provided by the top management, and carefully instructed in the motion study technique of job analysis by the time-

and-motion-study engineers of an organization, can aid materially in the reduction of set-up time. It is unlikely, however, that foremen will vitally attack the problem of curtailing set-up time unless directed to do so by higher management. Management, itself, must be sufficiently awake to the costliness of set-up time. It will then proceed to impress the importance of set-up time upon its foremen.—Glenn Gardiner, Forstmann Woolen Co.

Turnover Important

The manufacture of any commodity at minimum cost is essentially a problem of investment of funds. It involves the factors of quantity and time. Accordingly there are two basic principles to be observed in manufacture with respect of cost of production and these are (1) the quantity time factor of investment to produce a unit of product must be a minimum; (2) the turnover of working capital must be a maximum in a given time period.—Dr. Walter Rautenstrauch, Prof. of Industrial Engineering, Columbia University.

No Bottom

The cold, hard fact is that if any organization dares to believe that its costs can't be cut any further, there is someone waiting to say "If you can't do it, we can." That someone may be a direct competitor. That someone may be an indirect competitor or an entirely different industry ready to step forward with a substitute product. Or that someone may be an organized group of stockholders, or the banks, only too ready to turn out one management and put in another, or even an important customer ready to manufacture what he now buys from us.—Chapin Hoskins, Managing Editor, Forbes.

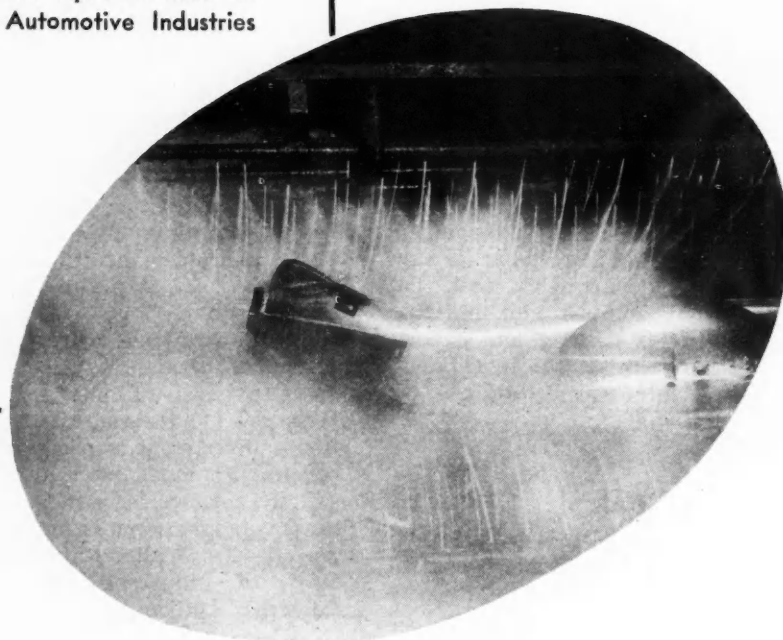


METAL CLEANING

Methods and

Part 2

Part 1 appeared in the April 15 issue of *Automotive Industries*



MATCHING the vigor of research activity in the many fields contributing to the automotive industry, the art of metal cleaning has made significant progress during the last two years. No factory executive can afford to overlook the importance of these new developments.

Part one of this study, published in *Automotive Industries* recently, outlined some of the essentials of the metal cleaning problems and went to some detail on the general applications of the materials and processes now on the market. Part two is concerned with a brief mention of the special features of some of these products and processes. Obviously, there has been no effort to make an exhaustive or inclusive analysis of the great diversity of the metal cleaning field.

To simplify the presentation, the products discussed in this article will be grouped under the following general headings which were used in part one:

1. Alkaline preparations.
2. Pickling.
3. Degreasing by means of organic solvents.
4. Electrolytic methods.
5. Electrolytic bright dip.
6. Bullard-Dunn process.
7. Cleaning tanks and rinses.
8. Metal washing machines.

1. **ALKALINE** cleaning probably is one of the oldest and most commonly used methods for the general run of metal cleaning where it is required to remove oils, grease, fats, dirt, etc. Although the various preparations on the market, as noted in table 1, are well known,

it is important to remember that the function of an alkaline cleaner may be rather complex; consequently the proper grade of a proprietary material for any given job should be recommended by the manufacturer.

Apart from the generally known alkaline preparations, there are a number of special compounds designed to meet certain conditions. For example—Houghton has developed "controlled" cleaning solutions for use on non-ferrous metals and their alloys. The "controlled" solutions contain free alkalies of low concentration. When such cleaners are used, the amount of cleaning material required is greater than with regular grades. However, this is a necessary compromise when it is required to clean, and at the same time protect, the surface of the metal.

The Magnus Chemical Co., in discussing its alkaline preparations, stress the factor of chemical "buffer" action—reserve strength. Thus it is said to be possible to produce solutions which, through buffer action, contain less active alkalinity but tend to maintain this steadily by progressive hydrolysis as the active alkalinity of the solution is used up or neutralized. Such compounds can take up considerable amounts of acid or alkaline dirt. Also they are said to refurnish any alkalinity removed from the solution in the cleaning process. This is accomplished by progressive release from a reserve of initially inactive or unhydrolyzed material present in the solution.

Perhaps one of the most interesting developments in this field was the recent introduction of the A.C.P. (American Chemical Paint) alkaline cleaning system. It is a feature of this system that the materials instead of being all inclu-

by Joseph Geschelin

Engineering Editor,
Automotive Industries

Materials

A Comprehensive Study of the Latest Developments in This Important Field

sive, that is instead of being a compound of alkali and soap, the ingredients are packaged separately. Thus there are available a number of grades of Ridoline, a specially prepared alkali, all of which are properly buffered and inhibited for the kind of metal and for the character of cleaning that are demanded; also a separate soap constituent.

With the A.C.P. cleaning system,

when making up a fresh bath, the amount of alkali recommended for any particular cleaning job is added to the water and then the prescribed quantity of emulsifier is added separately. The cleaning solution is operated in the customary way. It is claimed that the A.C.P. emulsifiers have a low surface viscosity so that very little foaming takes place.

The special feature of this

process lies in the use of a simple testing device called, the A.C.P. Chemical Test Set No. 2, which is used to analyze the bath solution, the information thus obtained being used to determine accurately the amount of Ridoline and emulsifier that must be added to the fresh bath or to reinforce it.

2. PICKLING also is one of the old established arts and the materials used are well known. Through a recent consolidation with Weaver Bros., the Houghton line now includes Pictrol, which is a well-known inhibitor used with pickling solutions. It also will include Ferro Pickle Pills, which are used for testing the strength of pickling solutions. The operation of making the test consists of dipping out a standard measure of solution, pouring it into a glass bottle with a little water and adding the pills one at a time. The color of the solution in the bottle, which becomes red when the first pill is added, changes to green with the addition of pills. The number of pills required to effect the color change gives the percentage of acid in the solution.

3. METAL DEGREASING by means of organic solvents has been one of the dynamic developments in the field of metal cleaning. Among those most prominently identified with this activity are The Dow Chemical Co.; Rex Products & Mfg. Co.; G. S. Blakeslee & Co., well-

Table 1 List of Suppliers of Metal Cleaning Preparations
(From Automotive Industrial Red Book)

Allied Industrial Products Co., 17 W. Elizabeth St., Chicago, Ill.	International Chemical Co., 2628 N. Mascher St., Philadelphia, Pa.
American Chemical Paint Co., Brookside Ave. & Reading R. R., Ambler, Pa.	Lake Erie Mfg. Co., 192-98 Chicago St., Buffalo, N. Y.
Blakeslee & Co., G. S., 1900 S. 52nd St., Cicero, Ill.	Magnus Chemical Co., Garwood, N. J.
Bruce Products Corp., 5712 12th St., Detroit, Mich.	Magnuson Products Corp., 55 Third St., Brooklyn, N. Y.
Buchanan Chemical Co., C. G., Baker Rd., Cincinnati, Ohio.	Michiana Products Corp., Sheet Steel Products Division, Michigan City, Ind.
Dearborn Chemical Co., 310 S. Michigan Ave., Chicago, Ill.	Oakite Products, Inc., 22 Thames St., New York, N. Y.
Ford Co., J. B., Wyandotte, Mich.	Park Chemical Co., Military & Vancouver Aves., Detroit, Mich.
Hanson-Van Winkle-Munning Co., Matawan, N. J.	Quigley Co., 56 W. 45th St., New York, N. Y.
Houghton & Co., E. F., 240 W. Somerset St., Philadelphia, Pa.	Rex Products & Mfg. Co., 13005 Hillview Ave., Detroit, Mich.
Industrial Chemical Products Co., 6540 Sylvester St., Detroit, Mich.	Rhodes & Co., James H., 153-59 W. Austin Ave., Chicago, Ill.

Table 2 Properties of Metal Cleaning Solvents
From Bulletin 18, The Dow Chemical Co.

	Ortho-Dichlor-Benzene	Tetrachlor-Ethylene	Solvent 164	Trichlor-Ethylene	Propylene Dichloride	Ethylene Dichloride	Carbon Tetra-Chloride	Solvent 100	Solvent 15
Solvent Action	Good	Good	Good	Good	Good	Good	Good	Good	Good
Fire Hazard (Flash Point)	°C. 63				±16	±12			
	°F. 145.4	None	None	None	±61	±53.6	None	None	None
Toxicity*	2.5 ± .3	1.6	1.6	1.7	2.0 ± .1	2.0 ± .2	1.0	1.0	1.6
Boiling Point	°C. 179	119-120	102-120	87.1	96.8	84	76.7	76-77	79-98
	°F. 354.2	247-248.7	215.6-248	189	206.2	183	170.2	170-172	174-208
Freezing Point	°C. -19.3	-19	-20	-70	-80	-35.3	-23	-20	-20
	°F. -2.7	-2.2	Below -4	-94	Below -112	-31.5	-9.4	Below -4	Below -4
Per cent Soluble in Water	Less than 0.01	0.01	0.118	0.096	0.28	0.89	0.076	0.08	0.19
	Cal/g	66.4	50.2	53	58	79	77.3	46.5	46.55
Latent Heat of Vaporization	B.t.u./lb.	119.5	90	95	104	142	139.2	83.7	83.8
	Cal/g/°C.	0.271	0.216	0.225	0.227	0.31	0.301	0.1992	0.200
Specific Heat	B.t.u./lb./°F	0.271	0.216	0.225	0.227	0.31	0.301	0.1992	0.200
Specific Gravity at 25 °C.		1.305	1.620	1.573	1.460	1.150	1.244	1.584	1.584
Weight per Gallon, lbs.		10.9	13.40	13.17	12.18	9.62	10.53	13.25	13.25

* Referred to Carbon Tetrachloride.

known manufacturers of metal washing machines; and the Carrier Engineering Corp.

The Dow Chemical Co. is interested only in the manufacture of commercial solvents while the other two companies make not only a proprietary solvent but also a line of degreasing equipment.

According to Special Development Bulletin No. 18 issued recently by The Dow Chemical Co., metal cleaning solvents must be examined for the following properties which are listed in order of importance:

1. Solvent action.
2. Fire hazard.
3. Toxicity.
4. Boiling point.
5. Solubility in water and ease of separation from water.
6. Latent heat of vaporization and specific heat.
7. Specific gravity.
8. Corrosion effects.

Tables 2 and 3, taken from this Bulletin, compare these properties for certain well-known metal cleaning solvents, Solvents 15, 100 and 164 being special proprietary materials.

While degreasing systems should

be so arranged as to offer minimum exposure of vapors to any possible source of ignition, it is naturally advisable to use non-inflammable fluid where possible. In a similar fashion it is necessary to eliminate all toxic hazards by designing a closed degreasing system that does not permit the vapors to circulate in the open air.

The most satisfactory degreasing solvent is the one which has a high boiling point. The higher the boiling point the more condensation occurs when the vapors come in contact with the cool metal parts. This facilitates the rapid removal of oily film and the washing away from the surface of any small particles of grease-bound grit.

According to Bulletin 18, while it is generally recognized that there is no corrosive action due to solvents in the pure dry state, it is pointed out that such a condition does not exist in an ordinary metal degreasing system. It is said that, in some cases, the amount of water collected and removed daily from a system containing 50 gal. of solvent amounts to nearly ten gallons. All of this moisture is thought to come from the residual traces of buffing

compounds. Fortunately it is possible to reduce materially the small tendency toward corrosive action by the use of inhibitive agents.

Rex Products & Mfg. Co. has developed a line of solvent cleaning machines using their proprietary solvent, Perm-A-Clor. This is a chlorinated solvent which is said to be non-explosive and non-inflammable. It is said to dissolve oils, fats, waxes, greases, buffing compounds or lubricants much more rapidly than gasoline, benzine, alcohol or oleum spirits. The solvent also is claimed to be permanent in quality, acid free in both liquid and vapor form and may be used over and over again.

G. S. Blakeslee & Co. have placed on the market a line of patented degreasing machines employing a chlorinated solvent known commercially as Blacosolv. This solvent is said to be non-inflammable, non-explosive; it does not support combustion and will not burn. It is said that Blacosolv does not attack any of the metals even in the presence of water, if handled according to the special instructions.

Blacosolv is a heavy, colorless, mobile liquid having a pleasant

odor, boiling below the boiling point of water. It is one and one-half times heavier than water; its vapors are four and one-half times as heavy as air and therefore easy to control. It has low toxicity and its vapors are only mildly intoxicating, but these effects are negligible through the use of a closed system from which the vapors are withdrawn by a positive exhaust system.

Carrier Engineering Corporation recently introduced a line of unit and continuous vapor degreasers using certain chlorinated solvents carrying the trade name, "Cecolene." The equipment is offered in dip tank units and in special designs which are adaptable to continuous conveyor systems. These units can be built to operate on steam, gas, or electricity.

In the Carrier degreasing system, Cecolene is boiled and vaporized. The vapor rises in the tank just to the level of water-cooled condenser coils arranged on the sides, where it is condensed and returns to the liquid in the bottom of the tank. The vapor is more than three times the density of air and has no tendency to overflow. The objects to be degreased are simply suspended in the vapor in the tank. The vapor condenses on the cold surfaces immediately and runs off profusely, carrying away all traces of grease. The objects reach the temperature of the vapor in from one-half to one and one-half minutes, depending on the weight or gage of the metal. At this stage they may be removed in a perfectly dry and greaseless state.

4. ELECTROLYTIC methods in general were fully described in part

one. The only emphasis that need be placed in this discussion is the fact that the commercially available alkaline preparations and pickling solutions may be used as electric cleaners.

5. ELECTROLYTIC BRIGHT DIP is a process for electrolytic pickling developed by Hanson-Van Winkle-Munning Co. and consists of treating steel in two acid baths.

In the final step, steel is made the anode in a sulphuric acid solution of definite strength, and when the temperature of the solution as well as current densities are kept within certain limits, all of the smut and black color is entirely removed and the surface of the metal is left a clear, gray-white. On common hot-rolled steel the surface actually becomes bright.

The electrolytic bright dip process is used after the steel has been pickled by any other process—preferably electrolytic—inasmuch as it is more rapid. Thus in the first bath, the steel is used as the cathode in a 31 per cent sulphuric acid which is heated to 130 to 140 deg. F. A current of 100 amps. per sq. ft. is applied. The time will depend upon the character and amount of the scale. Generally it takes from one to four minutes. Forgings, if made of low carbon steel, take about two minutes; high carbon steel, three to four minutes. Low chromium alloy steels can be treated from three to five minutes; high chrome steels, especially if alloyed with nickel, tungsten, or vanadium, are more difficult to handle.

The consumption of acid by this process is not great if reasonable methods of restoring the acid to correct concentrations are used. The

first bath in which the work is used as a cathode builds up in iron more rapidly than the second or the bright dip. The bulk of the oxide or scale is dissolved in the first bath.

The makers recommend the bright dip process for electroplating and other types of finishes which require a chemically clean surface. It is also recommended for gears or steel parts that are to be subsequently machined.

6. The BULLARD-DUNN process is a special electrolytic cleaning principle developed by the Bullard company. The process removes scales and oxides without pitting, without etching and without hydrogen embrittlement. Work cleaned in the process is penetrated so thoroughly, even to the bottom of crevices or scratches, that visual inspection of the piece becomes easy. When gears are cleaned, scale is removed from the entire surface, including the root of the gear teeth.

The process is carried out in tanks which may be served manually or with semi-automatic or full automatic equipment in accordance with production requirements. The work is hung on racks or carried in baskets, an interesting feature being that racks and containers are not destroyed in the process because once they have been cleaned there is little or no electrolytic action on them.

Lead or any other suitable material which is made a part of the scale removing bath is simultaneously deposited on the work in an extremely thin, dense film. This protective film prevents the base metal itself from being dissolved

Table 3

Corrosion Tests
(Metal boiled with 50 parts solvent and 20 parts water for 24 hours)
From Bulletin 18, The Dow Chemical Co.

Milligrams loss per Sq. in.	Ortho- Dichloro- Benzene	Tetrachloro- Ethylene	Solvent 164	Trichloro- Ethylene	Propylene Dichloride	Ethylene Dichloride	Carbon Tetra- chloride	Solvent 100	Solvent 15
1. Copper	0.75	0.45	0.50	5.0	1.00	1.10	266.50	0.40	378.0
2. Steel	7.10	4.10	5.30	4.45	4.90	2.65	23.60	1.75	9.70
3. Brass	1.70	0.6	0.35	0.55	0.40	0.60	6.65	0.10	4.70
4. K ₂ S	0.10	0.50	0.20	1.65	0.80	1.60	0.50	0.15	0.20

by the bath. Thus as the scale and oxide are blasted off the surface of the work, the dissolved metal in the bath coats over the exposed parts and inhibits the action of the solution.

In its latest development, the Bullard-Dunn process has been extended to include an alkaline degreasing treatment, acid descaling treatment, and an alkaline defilming treatment with the necessary water rinses between them. Thus, if forgings and other parts come from the hammers free from grease, the treatment would begin with the acid descaling. If machining operations follow this treatment, it is not necessary to use the alkaline defilming since the deposited protective metal film is too light to interfere with the machining operation. But if a chemically clean surface is required for painting, lacquering, or electroplating, the parts are placed for a short time in a reverse alkaline bath which removes the metal coating. Defilming is also recommended where an accurate inspection is desired after cleaning.

This process is recommended by the Bullard company for a compound treatment such as electro-tinning. In this case the iron or steel parts are cleaned in a bath containing tin as a protective metal film and goes directly from the descaling bath through a suitable flux into a hot tinning bath. It is claimed that this results in a superior quality of hot tin coating since there is no fouling of the tin bath and, consequently, a pure electrolytic coating is obtained.

7. The matter of cleaning tanks and rinses is rather well understood and has been covered to some extent in part one.

8. The market affords many makes and types of washing machines for alkaline cleaning of metal parts. These, of course, are well-known in the automotive industry. Lately there has been considerable activity in degreasing equipment utilizing organic solvents.

Blakeslee degreasers are available in many styles suitable for specific installations, but in general four types of equipment are available:

- a. Hand dip or immersion.
- b. That of spraying the boiling solution on the part to be cleaned.
- c. A combination of both dip and spray.
- d. Dip with a vapor rinse.

In the automatic type degreasers of the dip method, the work is suspended from the conveyors, cross-

bars or put in basket containers so as to pass through the system automatically for a dip wash and rinse as well as through a vapor.

The still is one of the essential elements in all Blacosolv degreaser installations. Although the degreaser itself can be made into or used as a still, the auxiliary equipment is said to be more efficient and requires less handling of solutions. In operation, a steady flow of fresh solvent is constantly passing into the dip tank from either condensing coils or the still. Oils, chips, and impurities are constantly removed so there is no danger of health impairment, decomposition of solution, etc.

Rex Products & Mfg. Co. has developed a line of horizontal and vertical type machines which are automatic in operation and designed to prevent loss of solvent. In a recent installation, parts go through the washer in three steps. Operation 1—the work is immersed in a solvent boiler maintained at a temperature of 186 deg. F. Here the major portion of oil, grease, etc., is removed, while the agitation of the boiling solvent effectively removes the solid matter. Operation 2—the work is immersed in a clean solvent rinse at a temperature of 165 deg. F., for a period of from 5 to 15 seconds. This reduces the contaminated solvent film left on the work in operation one, and cools the work down to 165 deg. F. Operation 3—the work, which is at a temperature of about 165 deg. F., is placed in a solvent vapor rinse, remaining in this position until the temperature is increased to 186 deg. F. This takes about one-half to two minutes. When the work has attained the higher temperature, it may be removed from the machine hot and

dry without atmospheric solvent loss.

The machine is so designed as to permit the removal of oil and sludge contamination from the solvent, thus making it possible to use the same solvent over and over again.

Conclusion—1. By following the procedure outlined in part one and part two of this study, it is possible to analyze the metal cleaning problem; select the right type of cleaning material and process; and select the proper kind of equipment.

2. Thus in cleaning parts coated with oil, greases, fats, chips, etc., there is the choice of alkaline cleaners, vapor degreasing, or an electrolytic alkaline bath. The adoption of one of these methods depends upon the variables discussed in part one and, to a great extent, upon quantity requirements.

3. Where it is necessary to remove scale developed from hot working or heat treating operations, there is a choice of still-tank or electrolytic pickling, the electrolytic bright dip, or the Bullard-Dunn process.

4. On the other hand there is a class of work which is contaminated not only with scale and oxide but also with oils, greases or fats. In this case it is necessary to use a combination of methods, one of the processes in item two being used to precede one of the processes selected from item three.

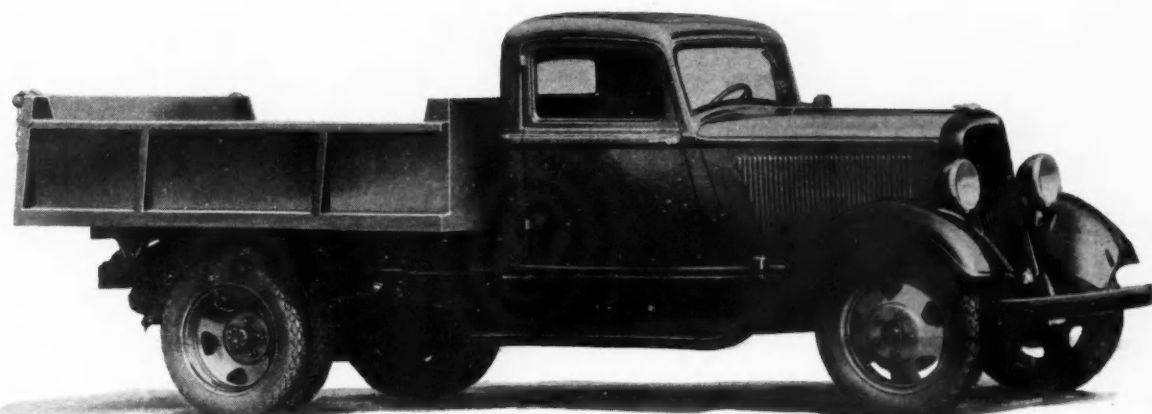
By far the most important conclusion that may be drawn from a study of metal cleaning is the fact that the selection of a cleaning material and technique is not a simple matter which can be decided without thorough and competent investigation. By the same token it is evident that a relatively simple but systematic analysis will suffice.

New Taxes Burden French Industry

NEW taxes devised in order to balance the French budget will fall heavily on certain sections of the French automobile industry and owners.

They include a 2 per cent tax on motor freight and bus receipts; an increase of 50 per cent in the registration fees on vehicles of parties possessing more than two and which are used in the transportation of merchandise for their own account; an annual tax of from \$23.60 to \$47.20, depending on their weight, on trucks of more

than 5½-ton load capacity; an annual tax of \$3.95 to \$15.80, depending on weight, on each trailer; an annual tax of \$23.70 to \$39.50 on vehicles whose area projected on the road exceeds 107.6 sq. ft.; ¾c. a gallon tax on motor fuel, and a tax of 65c. per 100 lb. on heavy fuel (Diesel) oil. Moreover, the provision of the present law under which passenger cars more than 9 years old pay only half the annual tax is to become void in the case of persons possessing more than two such vehicles.



A New Dodge 1-1½ Ton Truck

A NEW 1-1½ ton truck on two wheelbases at prices markedly lower than current on former models has been added to the commercial line introduced earlier this year by Dodge Brothers. The new model is known as the H-series 31 and 32.

In these new trucks, Dodge Brothers engineers have achieved a happy combination of "all-truck" appearance with the modern lines characterizing this year's passenger cars. Much of this is due to the front-end treatment, with its high and forward-sloping radiator shell with V-shaped bar grille finished in enamel. The fenders have deep crowns and sides and the side front splashers are formed integral with them. The hood has been extended back over the cowl, eliminating the conventional cowl sides. At the top the hood curves forward in the same manner as on Dodge Brothers' passenger cars, leaving room for a sizable ventilator. The roomier cab is also of new design, adding to the general attractiveness.

For the time being production at Dodge Brothers' own plants will be limited to the above standard body types, including a panel of unusual roominess, a stake, and platform bodies. Other types will be available later.

The H-series models have heavier frames and new universal joints of the small-diameter cageless roller type. The engine has been redesigned for increased economy of operation. Larger gas tanks, located under the seat, give an increased cruising range. Chrome-nickel-molybdenum iron is used in the cylinder blocks as a protection

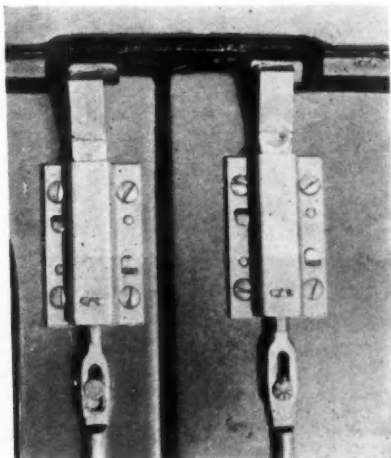
against distortion. A four-speed truck transmission is fitted. Such features as full-floating axles with larger pinion shaft of steel with higher (5 per cent) nickel content

and hydraulic four-wheel brakes are continued.

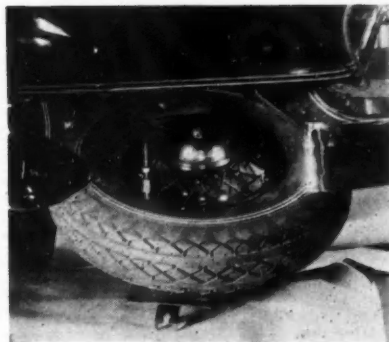
Among the interesting smaller details of the new models is a new tire and spare-wheel carrier. Located under the rear end of the frame it consists of a supporting carrier plate hung from both side rails by swiveling bolts. To change wheels, the nut on this bolt is unscrewed a few turns, and then permits lowering one side of the support plate to the ground and swinging the plate and wheel out behind the truck. The other wheel is then placed on the plate, which is swung back under the frame and then raised into place and locked. Other details of design include a rear step built integral with the rear bumper for easier access to the interior of the panel body, towing hooks bolted to the front spring horns (at extra cost), a ball-bearing water pump driven through the fan and fan belt, exhaust valve seat inserts to prevent valve-seat pounding (used in the previous models also), self-adjusting splayed anti-rattle locks, top and bottom, for the rear doors on the panel body; deeper cabs for increased leg-room, a double radiator splasher to increase the air flow through the core by forming a scoop; a Ball-and-Ball-type down-draft carburetor made by Carter, with air cleaner, etc.

The engine is said to develop about the same power and torque as on previous models, although the piston displacement has been reduced. The reduction of ⅛ in. in bore of the engine has been offset by an increase of ⅛ in. in the stroke.

Clutches, axles and brakes remain materially unchanged.



The panel models have rear door locks that are self adjusting and rattle-proof



This view of the rear tire carrier shows one side dropped

For normal driving the transmission is automatic and consists of a completely mechanical shifting device with four basic gear ratios

A SELF-SHIFTING, semi-automatic transmission is now standard equipment on the Reo Royale, and is available at \$85 extra on the Reo Flying Cloud models. For normal driving conditions the transmission is automatic in character.

Briefly it consists of a completely mechanical shifting transmission unit, having four basic gear ratios, only two of which are used for normal driving conditions. A control handle is located on the dash, having four positions. Pushed all the way in, the transmission is in "forward"; part way out it is in "neutral," and all the way back it is in "emergency low range" for which there are also two ratios, shifted automatically according to the car speed. With the control handle

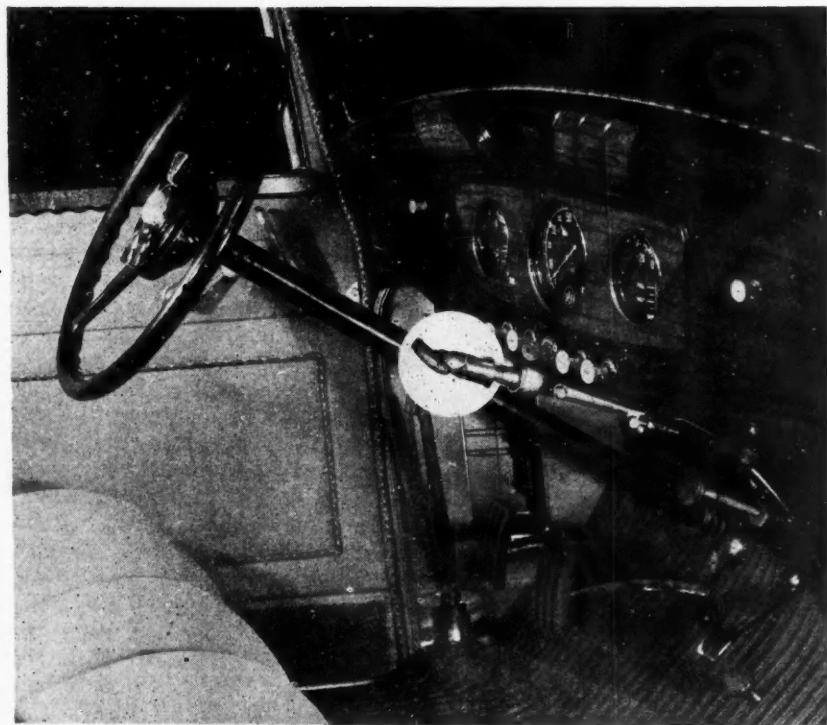
turned to the right and pulled all the way back the car is in reverse.

The conventional Long double plate master clutch and clutch pedal are retained, so that the start is made in the normal manner, by depressing the clutch, shifting into "forward" and letting the clutch back. With the accelerator depressed, the transmission is now in "low-high," having a reduction ratio of 2.07 to one. When the car speed reaches ten to fifteen miles

per hour, a centrifugal multiple disc clutch running in oil within the transmission gradually engages "high gear" or direct.

The shift into direct is so smooth that acceleration is completely continuous. Only the gradual reduction in engine speed serves as an indication that the shift is in process. From here on the transmission remains in high until car speed drops below ten to fifteen miles per hour. As a matter of fact normal adhesion between the multiple disc clutch plates will keep the car in high gear down to idling speed of four to five miles per hour. If the accelerator is suddenly depressed however at such speeds, the transmission shifts noiselessly into the aforementioned "low high" for more rapid acceleration. In other words the transmission remains in high until an accelerating ratio is really required. In this respect it duplicates admirably the public's driving habits.

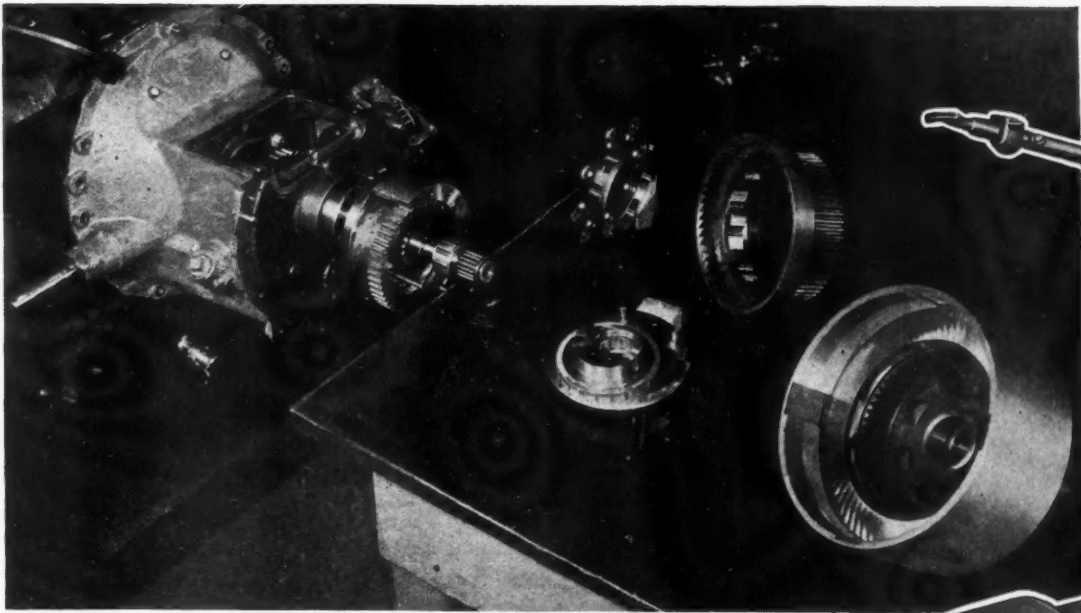
Self-Shifting



Reo driving compartment, showing speed control handle on dash

The accelerating ratio of 2.07 to one is adequate for all normal get-away requirements, even in quite hilly conditions, combined as it is with a very smooth operating master clutch. However, where additional power is required at the rear wheels, or when it is desired to accelerate in gear to speeds of 50 miles per hour or more, the control handle can be pulled all the way back engaging the low range. The centrifugal clutch in the transmission is effective in this range also, so that there is an automatic shift from low low to a "high gear" in the low range, and vice versa, thus providing flexibility.

A feature of the transmission is that in the high range the drive is directly from the clutch shaft through the multiple disc clutch to the transmission mainshaft and thus to the propeller shaft, the countershaft being completely idle. This further helps to reduce noise,



The view above shows the parts of Reo automatic transmission while that on the right shows the transmission complete



Transmission

is Standard on Reo Royale

while the design, together with the added inertia mass of the centrifugal multiple disc clutch adds to the smoothness of car operation, damping out synchronous vibrations between engine and rear axle. In effect the multiple disc clutch acts as an additional flywheel back of the main clutch.

Reduction for the get-away or low gear in the high range is obtained by a series of almost concentric internal-external gears. A spur pinion on the pilot shaft meshes with internal teeth on a gear which is supported on the tail shaft in such a manner that its "center" is approximately $\frac{5}{8}$ in. away from the center line of the pilot and tail shafts. This "center," of course, is not fixed, and revolves around the shaft center line. On the outside of this gear are cut external teeth meshing with internal teeth on a ring gear whose center is identical with that of the pilot and

tail shafts in the transmission, being mounted on splines on the tail shaft.

In effect then there is a spur gear on the forward shaft, a large diameter internal gear on the tail shaft and an intermediate idler gear of the internal external type supported from the shafts on anti-friction bearings. An over-running or "free wheeling" clutch is incorporated in the assembly in such a manner that all three gears will rotate only in the same direction.

When car speed increases to around 10 to 15 miles per hour centrifugal weights gradually engage the aforementioned multiple disc metal clutch, locking the large internal gear to the pilot shaft. When this has occurred the entire assembly revolves as a unit.

Ahead of the compartment in the transmission housing the above described mechanism is another compartment in which a counter-

shaft is located for obtaining the additional reduction required in the low range. The reverse idle is also located in this assembly.

Shifts from the control handle to the transmission are accomplished through a single simple Bowden wire control.

Free-wheeling units and automatic clutch mechanisms are not furnished by Reo with this new transmission.

The outside of the transmission case, at the rear and bottom side, is provided with cooling fins to reduce oil temperature. The multiple disc clutch within the transmission has an adjustable backing plate to take up for wear. The car speed at which this clutch operates can also be varied of course by the installation of heavier or lighter centrifugal weights.

A detailed explanation of operation of the device and sectional drawings follow on the next page.

Sectional Views of Reo Self-Shifting Transmission

Operation

The control handle at the instrument panel actually shifts the conventional gears which may be noted in the forward half of the transmission in the longitudinal section. In the normal forward position (control handle at instrument panel) the sliding gear (V) on spline shaft slides over the main drive gear (X)—making a direct drive through these gears. The countershaft gears also move forward, but do no engaging. The power is then applied by the spline shaft direct to the center of the automatic unit, through its integral gear (P). This gear is meshed with the slightly larger gear (R) which in turn—through external teeth—meshes with the large main gear (Q), which is directly connected to the propeller shaft, and drives the automobile. This is the internal gear train through which all normal starts are made.

Around the circumference of the large drum (S) are located eight governor weights (K) which tend to move outward by centrifugal force as the car speed increases. At approximately 14 m.p.h. these weights do move outward—pivot at the forward end—and smoothly engage and lock the multiple disks (F) through pressure plate (G), such action causing the automatic unit to rotate with the spline shaft as a unit with no gear reduction, therefore placing the transmission in high or direct drive. As the speed of the car is

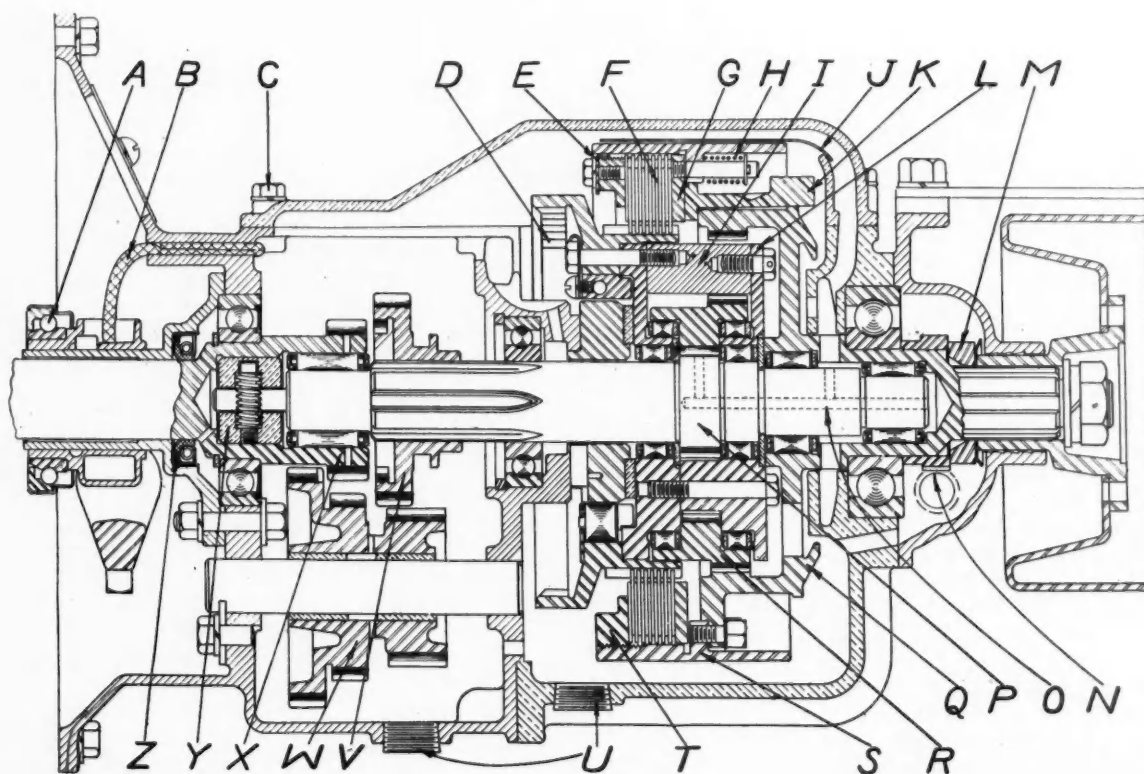
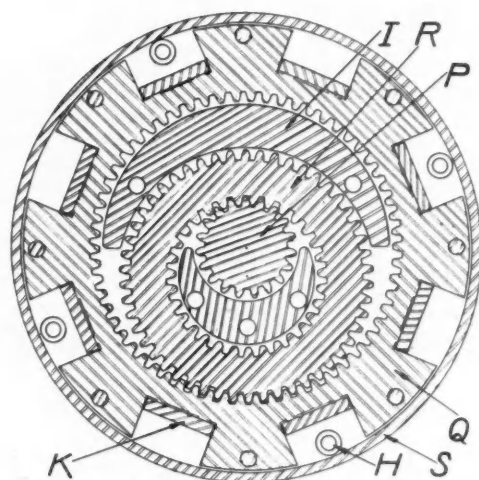
retarded below 10 m.p.h., the governor weights release the multiple disks—causing the driving to be done through the internal gear reduction.

In auxiliary low (control handle moved straight back) the countershaft gears (W) are moved back, the forward gear meshing with the main drive gear (X), and the second gear meshing with the sliding gear (V). A reduction is then gained through

these gears as well as the regular internal gear reduction in the automatic unit. When driving through these two reductions, and the car speed approaches approximately 15 m.p.h., the automatic unit changes into its own direct drive—then the drive is only through the forward gears. It will, of course, stay in these gears until the control handle at the instrument panel is moved to the forward normal position—shifting the forward gears into direct drive.

In reverse (control handle turned one-eighth turn clockwise in neutral and moved back) the sliding gear (V), also the countershaft gears are moved back—engaging through a reverse idler gear which rotates the spline shaft in reverse. The drive is, of course, also through the internal reduction gears in the automatic unit.

A—Clutch thrust bearing; B—Wick oiler; C—Venting cap screw, drilled; D—Inner drum; E—Lock plate, clutch adj. ring; F—Multiple disc clutch; G—Pressure plate; H—Press plate return spring; I—Counterweight; J—Oil pick up and passage; K—Governor weight (8); L—Rear plate for eccentric assembly; M—Spacer; N—Speedometer drive; O—Oil passage in shaft; P—Int. gear on spline shaft; Q—Main gear; R—Rotating int. gear; S—Outer drum; T—Clutch adj. ring; U—Drain plugs (2); V—Sliding gear; W—Countershaft gears; X—Main drive gear; Y—Synchronizing unit; Z—Grease retainer.



30-Hour Bill Held Sure to Pass as Part of Larger Plan for Controlled Economy

Administration Searching for Ways to Put Men Back to Work as Unemployment Reaches Thirteen Million—Public Opinion Favors Experimentation

By L. W. Moffett

Washington Representative, Automotive Industries

WASHINGTON—With a dramatic setting unprecedented in several ways, Secretary of Labor Frances Perkins appeared before the House Committee on Labor and a large audience to speak for the 30-hr. bill on Tuesday of this week. The large room was filled to overflowing with spectators who came to hear the first woman cabinet officer of the United States state her case for the administration-sponsored legislation which would vest in her office unprecedented powers over industry. Rigid and unworkable though certain features of the measure are claimed by some to be, the fact remains that it is the pre-dominating opinion that the present session of Congress will enact the legislation, probably modified.

Heretofore the idea that such legislation would receive serious consideration, much less the prospect of passage, would have been scorned. But with 13,000,000 idle, with many more on part-time, conditions have become desperate and desperate remedies are being proposed.

With movie spotlights turned upon her, with the wife of President Roosevelt and Ishbel MacDonald, daughter of the premier of England present, lending a sympathetic ear, Miss Perkins declared with determination that the idle must be put back to work. Wages must be restored. She conceded that possibly the bill has difficult features, setting six-hours a day, 30-hr. a week, as the labor yardstick, together with wage boards to fix minimum labor pay, and control over production. Yet she showed a certain spirit of compromise. She showed a willingness to agree to the ironing out of what might be shown to be unworkable phases of the measure. But she made it clear she would not agree to wide alteration of the measure. Industry must take idle workmen back to the bench, and wages must be established on a fair basis, in her opinion.

Not only was Miss Perkins ready with explanation of the bill but she also was quick to answer questions directed at her by a committee which appeared to be altogether sympathetic with the principles of the bill, if not

with all of its details. One of her telling points was that there are certain industries in the United States which plainly are taking advantage of present conditions and are paying workers, both male and female, wages that do not rate with those paid an oriental coolie. The better class of industries themselves have condemned this situation and are being made to unfairly share in criticism of wages paid. It perhaps is not too much to say that this practice of paying disgraceful "wages" in a few industries is the principal thing which is going to be attacked through drastic federal control of labor.

The motor and other industries have repeatedly recognized the necessity of restoring employment and of cutting down hours and weeks of work so that employment may be spread. But they are distinctly of the opinion that the bill sponsored by Miss Perkins is altogether too rigid. They will so tell the committee. The motor industry with other industries had representatives present to hear Miss Perkins testify and no doubt realized the strong impression she made on the committee.

Features of the bill held to be unconstitutional, such as the one which would fix minimum wages, though its supporters shy at the term "minimum wages," will have to be threshed out. But these and perhaps other features so as to adjust themselves to differing working conditions in different industries likely will be straightened out and the legislation passed.

Organized labor itself is opposed to a minimum wage, at least as applied to male labor and to wage boards. For organized labor fears the minimum wage would become the maximum wage and it wants a free hand to go after higher wages. Objection is made to wage boards on the same ground.

The presence of Mrs. Roosevelt at the hearing marked the first time so far as known that the wife of the Chief Executive ever attended a hearing before a committee of Congress. Her appearance and that of Miss MacDonald partially accounted for the large crowd. It also indicated that

the bill has the support of President Roosevelt.

The labor bill is quite generally considered part of the program of the administration plan to "regiment" industry. Vague though details of the plan of regimentation are so far, they are expected to be brought out in greater particulars soon. Under the plan it is said there would be set up an industrial council to advise government officials regarding planned production and distribution. The purpose, it is said, is to keep an even balance between the two. Sharp peaks and fast descending valleys would be avoided, if realization of the program comes about. The government would be the referee of industry. Industry, however, it is declared, would be taught to regulate itself. The extension of R. F. C. credit to industry to expand production with perhaps a partial guaranty against loss, are among the possibilities being mentioned in this connection. Controlled economy, managed currency, controlled inflation, wage boards, public works, elimination of bad trade practices all fit into the picture.

Anti-trust laws apparently would be shelved, if not by official action, by official approval, for those industries submitting to this board governmental control. Intrastate difficulties are seen but these too, it is said, will be given attention with a view to overcoming them. Even if the courts were appealed to the point has been made that the emergency conditions prompting the program would have passed. Yet some phases of control probably would be made permanent. Certainly Miss Perkins has no time limitation in her bill. The Black 30-hr. bill, recently passed by the Senate, provided for two years' operation.

The industrial council now is said to be under contemplation by Secretary of Commerce Roper. It evidently would cooperate principally with him. Difficulty is said to have been experienced in naming prominent men from industries as representatives of the particular industries with which they are chosen. The upshot is said to be that these industrialists will be selected by geographical groups, thus avoiding unpleasantness among industries. According to report it is proposed to name a council of 21. There apparently also would be advisory councils from the financial, banking and other sections of American business.

(Turn to page 538, please)

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Flexibility Feature of Hydraulic Grinder

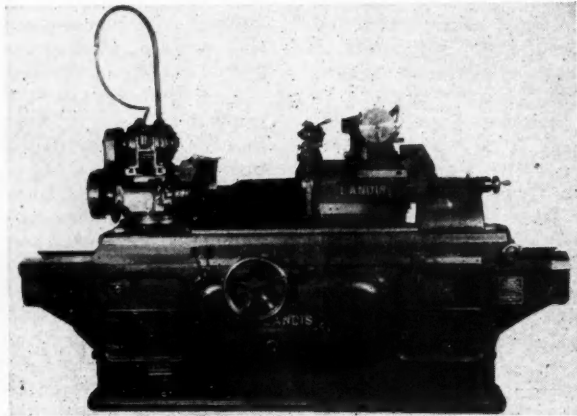
Landis Tool Co., Waynesboro, Pa., has placed on the market the 14-in., Type C hydraulic grinder, which has been designed to provide great flexibility. For rigidity and accuracy, the weight of the machine and the size of spindles, slides, bearings, etc., have been correspondingly increased.

The headstock is fully universal.

wheel feed mechanism, a center rest, stationary and traveling cutter tooth rests.

Another feature is the accessibility of the various mechanisms for adjustments, inspection or repair. Removal of the large cover at the front of the bed exposes all control mechanisms and pipe connections. None of them is entirely within the bed. The pump mounting at the rear of the bed is just as accessible.

This new machine may be had in



Landis 14-in., Type C hydraulic grinder

It may be swiveled as much as 90 deg. for face grinding. The wheelbase is just as universal. It may be swiveled 90 deg. either side of center and is equipped with a sub-slide so that the head may be moved forward or back as the nature of the work requires. Standard equipment includes such universal features as an anti-friction bearing type internal grinding fixture, a chuck for internal and face grinding, an automatic hydraulic

14-in. swing only and in three lengths, namely: 36 in., 48 in. and 72 in. Net weight of the 36-in. size without electric motor but with all standard equipment is 7650 lb. Net weight of the 48-in. machine is 8450 lb., while the 72-in. weighs 10,100 lb. A $\frac{3}{4}$ -hp. work drive motor is used, a one-hp. pump drive motor and a five-hp. wheel drive motor. All the motors are dynamically balanced and are of the constant-speed type.

Murex Method Avoids Vees

A new technique in arc welding, particularly suited to the joining of heavy plates, is announced by the Metal & Thermit Corp., New York, N. Y. Known as Murex "Straight Gap" Welding, the process does away with all need for "veeing" or grooving

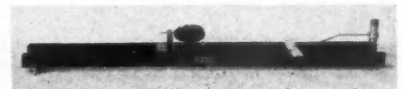
of plate edges. Plates may be used just as they come from the mill. Greater welding speed, as well as appreciable reductions in cost, are claimed.

At the same time, the company announces an addition to its line of Murex Heavy Mineral Coated Electrodes. Murex Universal is for use on mild steel and may be employed in either flat, vertical, or overhead work.

Reduction Test For Accurate Flats

A flatness measuring instrument, designed to give the same precision in measuring machined, ground, scraped or dull lapped surfaces, as is obtainable with the optical flat on highly finished steel surfaces, is being introduced by The Van Keuren Co., Watertown, Mass.

It consists of a channel supporting a cylindrical contact at one end—a micrometer with a spherical contact at the other end, and a sensitive light wave indicator with a spherical contact in the center. Means are provided for changing the positions of all three



Van Keuren Flatness Tester

contacts, to accommodate different surfaces such as flat ring-shaped laps, surface plates and machine ways. Special auxiliary contacts are provided for testing machined or scraped surfaces to avoid local hollow spots.

In operation, the micrometer end of the instrument is lowered until a very slight movement of the interference bands on the indicator shows contact of the center point with the surface being tested. The micrometer reading then shows the exact amount the surface is convex or concave, after a reading has been taken on a master flat surface.

Fafnir Is Producing Felt-Seal Bearings

The Fafnir Bearing Co. announces a new line of felt-seal ball bearings, which were developed with the idea of relieving the machine designer of the necessity of providing his own sealing system. Single sealed bearings of this type have been used increasingly during the past two years, but complete lines of both single and double felt-seal bearings are now available for the first time. The advantages of such bearings are listed as follows: Machining costs are markedly reduced, lubrication life is greatly prolonged, greater compactness in design is obtained, assembly is faster and disassembly easier, and a more effective seal is secured.

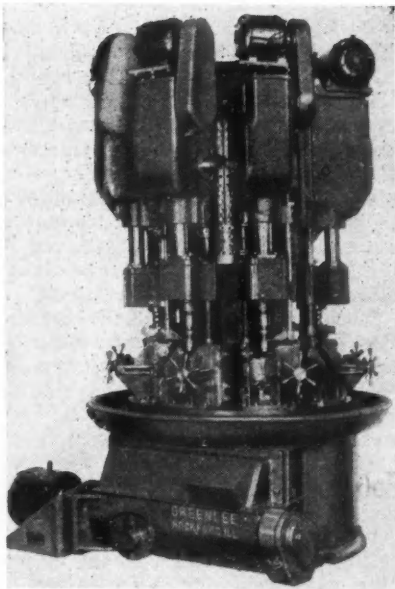
Longer Life for Nichrome V Alloy

According to a recent announcement, the Driver-Harris Co., Harrison, N. J., has added a new series of Nichrome (nickel-chromium) alloys, Nichrome V. This grade is said to possess longer life, greater overload capacity, and will heat up quicker.

Seven Stations In A Single Set-Up

A Vertical Indexing Machine of the oscillating cam-fed type is announced by Greenlee Bros. & Co., Rockford, Ill., for multiple-operation work upon large-production parts. It can be arranged for such operations as drilling, boring, reaming, counter-boring, spot facing, milling, threading and tapping.

The machine consists of a base supporting a table, which indexes automatically, and a circular column upon which is mounted a group of quill-feed drive units for attaching single or multiple-spindle drilling, boring and milling heads. The table indexing and feed drive members are located in the base and, as a standard, provide 3, 4, 6 or 8 table positions, one being used for loading. A change of one gear is all that is necessary to change the number of indexes per



Greenlee Indexing machine can handle a number of operations

revolution, and when required, provision can be made for other than standard positions.

On the standard machine, the column is drilled, tapped and provided with keyways for attaching the drive units in any or all table operating positions. Each drive unit has individual motor drive to the head drive spindle through silent chain and sprockets, and the feed is by segment cams mounted on an oscillating drum carried on the column. The heads can be designed to accommodate a large number of spindles, providing almost unlimited possibilities in meeting the needs of large-production parts.

In addition to the provision for changing the position of the drive units on the column, they can be placed at various heights to suit the

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

height of work and work holding fixtures. Each drive unit quill also has independent adjustment for height, and a hand turn-over is provided for setting the tools and checking head and quill adjustments.

Speeds Up Shaft Work

Jones & Lamson Machine Co., Springfield, Vt., has developed an automatic double end milling and centering machine for milling to length and centering to uniform depth, both ends of shafts, stem gears and similar pieces preparatory for the turning operations.

The machine has a single pulley drive through a multiple disk clutch mounted in the main drive pulley. It has a variable speed headstock arranged for three speed changes through sliding gears. All gears and shafts are hardened and ground and mounted on ball bearings. The milling and centering spindles are mounted on ball bearings set up under a predetermined load.

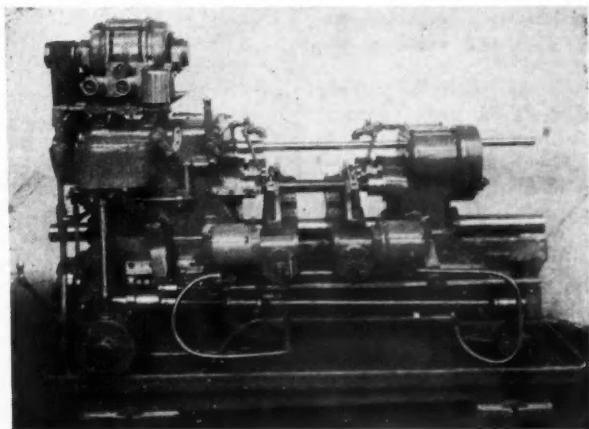
The right hand milling head is adjustable on the ways of the machine with a lead screw located on the back. Both work supports are adjustable so that they can be located to grip forgings or shafts in a convenient position. By loosening two clamp screws, these work supports can be moved longitudinally on the center bar of the machine to suit various lengths of work.

The machine shown here has seven operating and one loading position. It is used for rough and finish facing the cap seats and crowning, turning and threading the studs of connecting rods.

All movements of the machine are controlled by hardened cams on the outside of the cam drums, and the work holding units are supported on hardened and ground former blocks. The work is clamped in hardened V-blocks by electric torque motors operated by a drum switch conveniently located. Nine different feeds, ranging from 3 in. to 22 in. per minute, can be obtained with pick-off gears located in feed gear housing. The fast motion of the machine is obtained through a multiple disk clutch and drive shaft.

It is built in various bed lengths with maximum distance between milling cutters of 20 in., 32 in., 44 in., 62 in. and 80 in. For short work, by removing the right hand work holding fixture, the right hand head can be moved up so that the length of the work that can be milled and centered depends only upon the width of the remaining V-block and holder.

The standard V-blocks, cutters and cams are designed for round stock from $\frac{3}{4}$ in. to $3\frac{1}{2}$ in. diameter. Additional V-blocks, cams and cutters can be furnished to increase the capacity of the machine so that it will accommodate work up to and including $4\frac{1}{2}$ in.



Jones & Lamson automatic, double end milling and centering machine

Fourteen Per Cent Gain Over February Puts March Output Close to '32 Level

Three Month's Total Only 1 Per Cent Behind Last Year—Passenger Car Production Shows Slight Gain Over March, 1932—Ford 40,000

WASHINGTON, D. C.—March production of passenger cars and trucks in the United States and Canada amounted to 125,224, according to the Census Bureau. This total is considerably in excess of most previous estimates for last month and indicates that manufacturing operations rebounded rapidly following the bank holiday.

March output was less than 2 per cent behind the same month a year ago when output totaled 127,277. As compared with February, 1933, a gain of about 14 per cent is shown, the total for that month was 110,123.

The expansion in March production from February was, however, of less than normal seasonal proportions as the Automotive Industries output index, based on monthly averages for

the last eight years, dropped to 32 last month against 35 in the preceding month.

For the first three months of the year production amounted to 368,749 as compared with 373,247 in the first quarter of 1932, a loss of 1 per cent which is encouraging considering the banking interruption.

Passenger car production in March, including taxicabs, was 0.5 per cent ahead of March a year ago and 13 per cent ahead of February. Truck production last month was 12 per cent behind a year ago but registered a gain over February of 20 per cent. Canadian output declined 24 per cent under 1932 but was nearly twice the February, 1933, total.

Ford production in March approximated 40,000.

C.I.T.—U.C.C. Merger Reported in Progress

Would Give C.I.T. Financing Contracts with Factories Now Getting over 25% of Car Sales

NEW YORK—Reports of the impending absorption of Universal Credit Co., the Ford time financing organization, by Commercial Investment Trust Co., are current here. C. I. T. has financing contracts covering Nash, Graham, Hupp, Marmon, Pierce-Arrow, Auburn, Studebaker, Federal, Reo, Hudson, White, Continental and Rockne. During the first two months of this year, registrations indicate that these companies got 8.2 per cent of unit volume. Ford during the same period obtained 17.3 per cent. The merger therefore would give C. I. T. financing contracts with factories currently selling 25.5 per cent of domestic volume.

Consummation of such a merger would give C. I. T. a gross volume closely approaching that of G. M. A. C. Last year, the latter organization had a gross volume of \$412,527,089 as compared with a C. I. T. gross of \$317,397,520. A large proportion of G. M. A. C. volume, however, is automotive as only 43.17 of C. I. T. outstandings at the end of the last year were in the automotive field.

Although the rumored merger has been interpreted as an evidence of Mr. Ford's distaste for the banking business, the move would have certain economic advantages. C. I. T. now has branch offices in 34 cities and the U. C. C. field force in a general way dup-

licates this organization. Obviously with automobile sales at current levels, and with the proportion of cash buyers of cars on the increase, the elimination of this duplication should mean substantial savings in operating expenses.

The Universal Credit Co. was formed in 1928 to finance Ford dealer sales with an authorized capital of \$21,500,000. Its president is Ernest Kanzler, brother-in-law of Edsel Ford. Just what interest, if any, the Fords personally have in it, has never been revealed, nor have any statements ever been published on the extent or results of its operations. It is estimated that currently its volume is of the order of \$100,000,000 yearly.

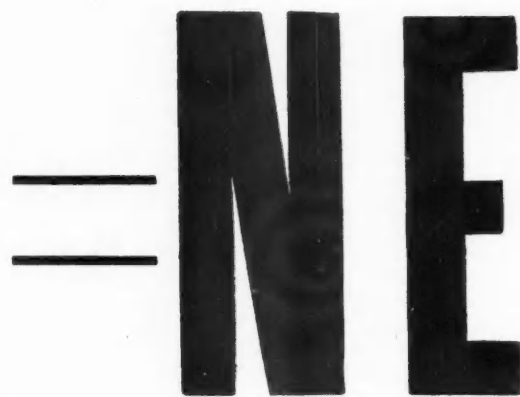
1 1/2-Ton Dodge Truck Chassis Lists at \$490

DETROIT—Prices on the 1 1/2-ton Dodge trucks described on page 527 of this issue, follow:

	131-in. Wheelbase	157-in. Wheelbase
Chassis	\$490	\$520
Chassis with cab	580	610
Panel	765	...
Platform	635	680
Stake	665	725

Chalfant Marries

DETROIT—E. P. (Ned) Chalfant, executive vice-president of the National Standard Parts Association, is receiving the congratulations of the industry on his recent marriage to "Betty" Dickerson, who was the widow of C. W. Dickerson, formerly vice-president of the Timken Detroit Axle Co.



Studebaker Holders Vote Stock Increase

Current Debts Amount to \$4,000,000—More than \$1,500,000 Cash on Hand

JERSEY CITY, N. J.—An increase in the authorized common stock from 2,500,000 to 3,125,000 shares was authorized by the stockholders of the Studebaker Corp. at their annual meeting held on Tuesday of this week. Directors were also empowered to make the 6 per cent notes amounting to \$14,269,200 issued in connection with the White purchase, convertible into common at the rate of one share of common for each \$25 of notes.

Resignations of Paul G. Hoffman, Harold S. Vance and A. G. Bean, receivers for the corporation, were accepted and J. M. Studebaker, 3d, Edward N. Hurley and George H. Kelly were elected to succeed them.

Board Chairman F. S. Fish said that the company had no cash when the receivers took charge but that it now has between \$1,500,000 and \$1,750,000. Continuing he said in part "We have held our organization together and we are selling cars beyond our anticipation. The corporation owes about \$4,000,000 in unsecured bank loans. Most of the bank creditors are friendly and helpful. . . . I am extremely optimistic for the future and it is only a question of a short time before the merchandise creditors, the banks and the holders of the corporation's notes will get together for a reorganization." Mr. Fish also said there was a possibility that the reorganization would be completed and the receivership lifted by fall.

Graham 1933 Break-Even Point Put at 14,000 Cars

DETROIT—The break-even point for Graham Paige this year is 14,000 cars according to President J. B. Graham. On sales of 15,000 cars, the company should show a small profit and an improvement in its cash position of \$600,000.

WS

Factories Expand Output Schedules as Sales Maintain Strong Up Trend

Activity Most Pronounced in Under \$750 Field but Higher-Price Cars Beginning to Benefit by Improvement in Retail Market, Survey Reveals

By Athel F. Denham
Field Editor, Automotive Industries

G.M. Abolishes Dealer Management Service

Car Divisions Take Over Activities Inaugurated by Motor Accounting Co.

DETROIT—Transfer of the former activities of the General Motors Management Service, successors of the original Motor Accounting Co., to the various car divisions was announced this week to General Motors dealers. Functions of this organization included the auditing of dealers' books and installation of accounting systems together with management service to dealers to enable them to improve their profit position. According to D. S. Eddins, assistant to R. H. Grant, General Motors Management Service has completed its major task by auditing the books of and training the greater percentage of General Motors dealers.

It therefore has been discontinued as a separate company and zone and regional personnel is thereby materially reduced, simultaneously reducing the cost to the dealers. Many of the zone and regional men formerly employed by Management Service have been transferred to the car company operations including Buick-Olds-Pontiac, Chevrolet and Cadillac and will continue to contact dealers, the cost being absorbed by the car companies themselves. Where complete audits of their books are still desired by individual dealers, the assistance of established auditing companies outside of the General Motors organization will be called in.

Reo Truck Prices Reduced \$50 to \$400

DETROIT—Reo announces following price reductions in truck and speedwagon line:

	Old Price	New Price	Reduction
1-1½ ton, 4-cylinder	\$625	\$575	\$50
1½ ton, 6 cylinder	795	695	100
2 ton, 12,500 lb. gross	1,095	945	150
2 ton, 15,000 lb. gross	1,625	1,245	380
3 ton	2,035	1,795	240
4 ton	2,995	2,595	400

DETROIT—No break has yet become apparent in the steady climb of automobile retail sales. The week ending April 22 showed a further 10 to 15 per cent increase in deliveries to owners. While activity in the under \$750 field is most pronounced, higher priced lines have begun to feel a definite effect in car movement.

During the second 10 days of April, Chevrolet sales totaled better than 17,000 compared with 13,400 the first 10 days, an increase of 23 per cent.

Plymouth schedules for April of 22,000 units represents the biggest month since the six was introduced and second largest month in history of company. If present trends continue May should set a new production record for Plymouth. Employment now totals 6000 and field forces have been doubled.

Ford increased production this week to 2500 daily, five days a week, and is reported to be running behind on deluxe models.

Retail deliveries of Dodge cars are running 100 per cent ahead of last year with total retail sales of Dodge dealers well ahead of any month since early 1931.

Continental Automobile Co. went back into production April 21 on all three lines and shipments are going forward to dealers. An automatic clutch of the centrifugal type has been adopted as standard equipment on the Ace model.

Hupmobile showed a 13 per cent increase in sales last week compared with preceding seven days, with first 22 days of April 165 per cent of same period in March, making April apparently biggest month since last June.

During the second 10 days of April Pontiac sales increased to 2604 against 2413 the first 10 days. Pontiac, as well as Chevrolet, should show larger retail sales for April than last year. Pontiac production has been stepped up once more and is now scheduled at 8100 for April.

Oldsmobile retail sales showed an even greater percentage increase than Pontiac during the second days with approximately 20 per cent more cars registered than in first 10 days.

Retail sales reports from Hudson-Essex dealers indicate that April sales will be well in excess of the 4400 registered last April. Unfilled orders on hand April 20 for immediate delivery totaled 2512 passenger cars, domestic, and 426, export.

Buick sales during the second 10 days continued to hold to the same

high level reached for the year during the first 10 days with slightly more than 1400 retail deliveries for each 10-day period.

Inquiries from abroad and actual orders from overseas dealers for the industry generally have showed a sharp upturn during the past 20 days, largely as a result of the decrease in exchange value of the dollar. Actual figures so far are not available.

G.M. First Quarter Earnings \$6,870,007

Unit Sales Up 1% But Dollar Volume Down 20%

NEW YORK—Net earnings of the General Motors Corp. in the first three months of 1933 amounted to \$6,870,007 as compared with \$9,693,027 in the corresponding quarter of 1932. These earnings do not reflect any provision for losses on cash balances in closed banks amounting to \$13,943,878 "since the extent of these losses is not determinable at this time."

Unit sales in the quarter increased to 199,749 cars and trucks from 197,256 a year ago, but sales volume declined from \$149,663,716 to \$120,000,163, a gain of about 1 per cent in the former case as compared with a loss of about 20 per cent in the latter. Net earnings were 5.7 per cent of sales for the 1933 quarter against 6.5 per cent a year ago.

Comparative balance sheet data follow:

	March 31, 1933	Dec. 31, 1932
Cash and securities	\$148,211,686*	\$172,780,695
Net working capital	217,468,700*	225,437,194

*Excluding balances of \$13,943,878 in closed banks.

After deducting preferred dividends of \$2,294,930, there remained \$4,575,077 for the common equivalent to 11 cents a share. In the first quarter of 1932, common earnings were 17 cents a share.

April May Top 160,000

DETROIT—April production of cars and trucks now seems certain to exceed 150,000, and may top 160,000. If the latter figure is reached, it will be the largest monthly production since June, 1932. April output last year was 155,000.

Indianapolis Prize Money Reduced 40%

Entry Fee Also Cut
from \$200 to \$100

INDIANAPOLIS—Prizes for the first 10 finishers in the Memorial Day 500-Mile Race have been reduced 40 per cent, revised entry blanks distributed by the Indianapolis Motor Speedway Corp. indicate. First prize accordingly has been cut from \$20,000 to \$12,000, and similar reductions have been made in other prizes.

Another feature of the prize money also has been changed in the revised list. According to the original lists sent out early this year, not less than 75 per cent of the entry fees was to be returned to the drivers in consolation prizes. This provision has been changed to read that the Speedway reserves the right to distribute a part of the entry fee money in the form of consolation prizes to cars not winning other prizes, with no mention of the proportion.

As previously announced the Speedway corporation has reduced the price of the general admission tickets to the race course 50 cents, from \$2.50 to \$2.00, or 20 per cent. According

to T. E. (Pop) Myers, general manager, the reduction of income for the Speedway with a crowd of 100,000 persons will be considerably greater than the cut taken by the car entrants by the reduced prize list.

A further concession has been made to the car entrants in the form of a 50 per cent reduction in the cost of entering a car in the race. The original entry blanks called for an entry fee of \$200, which is not refunded in any event. The new blanks put the entry fee at \$100.

The possibility of trouble with the car entrants who had signed entry blanks calling for the larger prize list is believed to have been avoided by the Speedway corporation by making it necessary to sign the new entry blank before the car and driver are eligible for the race. Naturally the downward revision in prize money has occasioned some resentment.

Citroen Resumes

NEW YORK—Citroen plants, closed three weeks as the result of a lock-out, have been reopened with 11,600 of the 18,000 workers answering the call to come back to work, the *New York Times* reports.

Graham Has 60% Gain in Week

DETROIT—Graham retail deliveries for the week ending April 8, were the largest for the year, showing a 60 per cent increase over the previous week, according to an announcement by R. C. Graham, vice-president.

Production schedules have been increased considerably for the remainder of April, Mr. Graham said. Chicago and New York districts showed the largest gains in retail sales. This is the fourth consecutive week to show a pronounced upswing in retail deliveries, the announcement stated.

Inquire About Diesel Motor Bus Engines

PHILADELPHIA — The Foreign Trade Bureau of the Philadelphia Commercial Museum has an inquiry concerning diesel type engines for passenger buses from the Pampanga Bus Co., Inc., of San Fernando, Pampanga, P. I. The company is affiliated with 11 others which operate about 900 buses.

Moving Averages Picture Swing to Low-Priced Cars

The 12 month moving monthly average of U. S. passenger car sales has been declining steadily since October, 1929, at an average rate of 6100 cars per month. The average reached its peak of 327,000 at the end of October, 1929, sales during the 12 months immediately preceding having reached the largest total in the industry's history. At the end of February, 1932, the moving average was down to 91,000 cars.

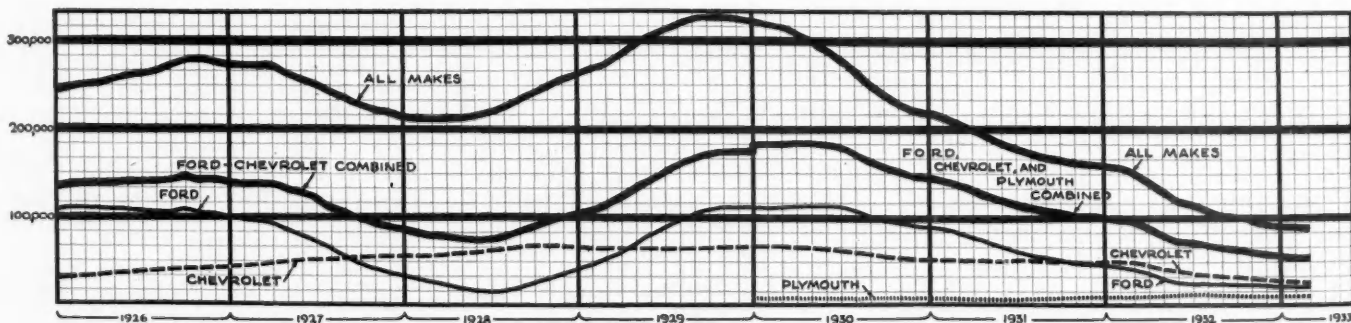
One of the significant indications of the accompanying chart is the more rapid rate at which the moving average curve for all makes has declined than the combined moving average for Ford, Chevrolet and Plymouth. The steadily declining area

between these two curves gives an unusually graphic view of how much more seriously the "all others" group has been affected by the depression. At the peak in 1929, the monthly moving average of the "all others" group was nearly 45 per cent of the moving average for all makes, while at the end of February, 1932, this percentage had been reduced to 37.

The moving average of Ford sales reached its peak in May, 1930, with 110,000 units. Since then it has declined to 22,000 at the end of February, the average monthly decline during the period being 2700 cars. Chevrolet's peak came in February, 1930, when its moving average was 66,000. In the next two years, its

moving average declined to 26,000, the average rate of monthly decline being 1100 cars.

Plymouth reached a low point in June, 1931, when the moving average was approximately 4000 cars. Then it began to climb at the approximate rate of 670 cars per month until the monthly moving average reached 12,000 in June, 1932. A five-month's slow decline then set in so that at the end of November, 1932, the moving average was 9000, the average rate of decrease in the moving average during this period being 600. Since that time the moving average for Plymouth has been increasing 400 cars per month and at the end of February was at 10,200 cars.



Each monthly point on the accompanying curves represents sales during the preceding 12 months divided by 12.

No License Fee for New Cars in Germany

New Ruling Designed to Aid Sales—Effect on Used Car Sales Feared

BERLIN (By Mail)—The German Department of Finance on April 8 issued new regulations according to which all private passenger cars and motorcycles placed in service for the first time after March 31, 1933, will be exempt from taxation. This does not apply only to the current year but for the life of the cars and regardless of how many times they may change hands. Old cars, however, which were in service previous to March 31, will remain subject to the annual tax. The principal object of the new regulations undoubtedly is to favor the sale of new cars and thus bring business to the automobile industry. However, since the annual tax is quite high, it will probably be almost impossible to sell used cars, and this will tend to keep present owners out of the market for new cars. Dealers, therefore, are not entirely satisfied with the new regulations and the official organ of the German Automobile Dealers' Association voices the opinion that in future dealers will take in used cars only on a commission basis.

March Car Sales Are Estimated at 80,000

PHILADELPHIA—March registrations of new passenger cars in the United States amounted to 80,000 against 92,000 a year ago and 69,500 in February of this year according to estimates based on returns from 39 states. This represents a decline from March, 1932, of approximately 13 per cent and an increase over February of this year of about 15 per cent.

On the basis of these partial returns Chevrolet registrations amounted to about 27,000, Ford 16,400 and Plymouth to approximately 10,000 units. As compared with March, 1932, Chevrolet shows a decline of 10 per cent, Ford an increase of about 108 per cent and Plymouth an increase of about 79 per cent.

Alcohol Blending Is Rank Discrimination, Ames Says

NEW YORK—Conservation of the nation's petroleum resources would not be aided by adoption of the proposal to enact Federal or State legislation making mandatory the blending of alcohol with gasoline for motor fuel purposes, in the opinion of C. B. Ames, president of the American Petroleum Institute.

"The petroleum industry is like the farmer," he explained. "They are both suffering from overproduction, and the petroleum industry is like-

wise suffering from decline in consumption of its products. To compel all motor vehicles to use a blended product which is inferior in quality and higher in price is not sound economics and is a rank discrimination both against the petroleum industry and the motor vehicle."

Buick Gets Good Start in April

DETROIT—April sales of Buick cars are running well in excess of the March record, according to a report by W. F. Hufstader, Buick sales manager. During the first ten days of the month, Buick dealers sold 1405 new cars which is not only a heavy gain over the total of 573 cars sold in the first ten days of March, but is not far from the total of 1539 cars sold during the last ten days of that month, the report stated. Buick is now operating on a five-day week.

Morse and Bauer Speak at Exporters' Meeting

Basic Problem, Former Says, Is to Coordinate Overseas Operations With Domestic

PITTSBURGH — E. C. Morse, president, Chrysler Export Corp., and George F. Bauer, manager of N. A. C. C. export department, were among the leading speakers at the twentieth National Foreign Trade Convention held here this week.

"Our problem in export," Mr. Morse said, "basically, is to coordinate our operations with those of the domestic market insofar as this is practical. The first step toward the accomplishment of this result is to undertake to render our domestic organization 'export conscious.' Once our problems are understood in America, we are readily afforded that co-operation and assistance which are necessary for the better development of our trade abroad.

"In our operations," he continued, "we do three things to assist toward the understanding and sympathy which we consider just as essential to our success as our own sympathy with and understanding of the Domestic Policy. First, we make every effort to hew to the line established by our Domestic Policy. Second, we never ask for concessions or changes in that policy without first making an exhaustive study of what such deviations mean to the men and the operations involved. And last but not least, we actively and enthusiastically sell 'Export' to our Domestic executives."

Mr. Bauer said in part: "One frequently hears a domestic sales executive exclaim that we are a self-sufficient country . . . I cannot help but feel that an executive of that kind fails to realize that he is stealing somebody else's thunder when he in-



One of six unique wood-carvings and panels typifying American automobile craftsmen, made for the General Motors building at the Chicago Century of Progress Exhibition by noted Swedish-American artists, Carl Hallsthammar and Axel Linus. The figures are carved from laminated pine and painted in life-like colors. The statues and panels are part of a gallery of industrial art in the G.M. exhibit

cludes cotton growers in Texas as domestic customers. The mere fact that he can sell to the Texas cotton grower is due to the abilities of foreign nations to buy 90 per cent of Texas cotton crop . . . This is but one instance of an exaggerated emphasis on domestic buying power.

"Surely," Mr. Bauer said further, "with so many relationships between imports and domestic operations the American manufacturer has a definite responsibility in studying foreign trade in its broader aspects, recognizing the essential part of imports in the entire structure and thereby preparing himself to aid constructively in the projects already under way and shortly to lead to a new deal for the entire world and for our own country as a part of it."

Timken First Quarter Report

CANTON, O. — Timken Roller Bearing Co. reports net loss after charges for the quarter ended March 31 of \$276,066 against a net income of \$217,617 in the corresponding 1932 quarter.

Detroit Molding Buys Jay Hayes Division

DETROIT—The recently organized Detroit Molding Corp. has purchased the molding division of the Jay Hayes Industries of Lansing and the entire business and equipment of the Grand Rapids Metal Craft Corp. Operations will be concentrated in Detroit. L. A. Young, president of L. A. Young Spring and Wire, is also president of the Detroit Molding Corp. Mr. Young stated that the plant will have facilities to turn out moldings for 6000 automobiles each eight-hour work day and is expected to start early in June. Machinery and other equipment are being moved from Grand Rapids and Lansing to the new plant. V. H. Kendall is vice-president and general manager of the new company, and A. D. Coffin is secretary.

30-Hour Bill Sure to Pass

(Continued from page 531)

The undertaking sounds huge—some say it is fantastic—but in these days the orthodox is overboard. The heterodox has come into its own and the temper of the country is such that it is willing to try anything. Moreover, an increasing number of business men, driven and harried by destructive price competition, have become receptive to, and in some cases, anxious for some greater degree of control.

The country has strong confidence in President Roosevelt's judgment, his common sense, and certainly his sincerity. This with a strong Democratic party back of him gives him a powerful hand to try out a program to get employment back on an even keel and with it a recovery of industry and purchasing power. In short, a successful steer around the much discussed corner.

Houdaille Loses \$218,435

DETROIT—A loss for the first quarter of 1933 of \$218,435 is reported by Houdaille Hershey Corp., as compared with a loss of \$225,592 in the corresponding 1932 quarter. Both figures are after interest, depreciation, taxes, etc., but before provision for dividends on Class A stock of its subsidiary, the Muskegon Motor Specialties Co.

Chrysler Entertains Cost Accountants

DETROIT—Chrysler Corp. was host to a thousand members of the Detroit chapter, National Association of Cost Accountants, at the Plymouth plant this week. The gathering, following a banquet in the executive of-

fices, at which O. J. Olsen, Chrysler executive, presided as master of ceremonies, was addressed by H. G. Moock, sales manager of Plymouth, and L. A. Moehring, controller of Chrysler. A discussion period was led by Robert Pierce, secretary of Briggs Body Corp.

Hupp Quarterly Report

DETROIT—Hupp Motor Car Corp. reports a net loss for the first quarter of 1933 of \$522,997 against \$596,176 in the first three months of 1932.

The March 31, 1933, balance sheet shows current assets of \$6,764,768 including cash of \$1,983,904 and securities of \$2,324,152. Current liabilities were \$941,895, leaving working capital of \$5,822,873. The cash item includes \$473,711 in closed banks. Working capital on Dec. 31, 1932 was \$6,209,287.

N.S.P.A. Obtains New Federal Tax Ruling

DETROIT—Sales of taxable materials by wholesalers to states and their political sub-divisions are not subject to federal tax if the jobber makes such sales as the representative of the manufacturer, and shipment and billing are handled direct by the manufacturer, according to a ruling obtained from the Treasury Department by the National Standard Parts Association.

Link-Belt Quarterly Report

CHICAGO—Link-Belt Co. and subsidiaries sustained a net loss after charges of \$205,672 in the first quarter of 1933 as compared with a loss of \$174,809 in the same quarter a year ago. Quarterly sales declined from \$1,821,759 in the 1932 quarter to \$1,419,246 in the quarter ended March 31.

Diamond T Working Capital

CHICAGO—The Dec. 31, 1932, balance sheet of the Diamond T Motor Car Co. shows net working capital of \$850,781 as compared to \$1,133,288 a year earlier.

John B. Childe

SPENCER, O.—John B. Childe, vice-president and general manager of the Spencer Manufacturing Co., died here Sunday, April 23.

Wilcox-Rich Reports Loss

CLEVELAND—Wilcox-Rich Corp., subsidiary of Eaton Mfg. Co., reports deficit after taxes and dividends on Class A stock, of \$23,203 for the first three months of 1933 as against a surplus of \$42,483 in the first quarter of 1932.

Willys Authorized to Make 1600 Model 77's

Receivers Go to New York for Conference on Sales

TOLEDO—Authority to the receivers of the Willys-Overland Co., to finish 1600 of the Willys 77 models was granted late Tuesday by the Federal court here.

The completion of these units will mean additional jobs for about 500 workmen for a few weeks.

John N. Willys and L. A. Miller, receivers, with Ward M. Canaday, president of the United States Advertising Corp., left Monday night for New York to attend conferences on sale of the new cars and some steps toward reorganization of the company.

Tuesday was the scheduled day for the annual meeting of stockholders of the Willys-Overland Co., but no meeting was called on account of the receivership.

Employment in Toledo plants during the last week showed a gain of about 260 workers, bringing the total employed in 51 plants to more than 10,000 as compared with approximately 15,000 before the banking holiday.

As a part of a big merchandising event, sponsored by the Retail Merchants Board, two blocks on Madison avenue in the heart of the financial district, Tuesday, were devoted to displays of cars by members of the Toledo Automotive Trades Association. Twenty-five dealers participated.

G.M. Assumes Leading Role in Aeronautics

NEW YORK—General Motors, as a result of action by the stockholders of General Aviation Corp. and North American Aviation, Inc., now becomes the dominating factor in the latter company and its wholly owned subsidiaries which consist of General Aviation Manufacturing Corp., B/J Aircraft Corp. and Eastern Air Transport, Inc. North American also has substantial interests in Douglas Aircraft Co., Inc., Western Air Express Corp. and Transcontinental Air Transport, Inc. The latter two companies each hold a 47½ per cent interest in Transcontinental and Western Air, Inc.

General Motors owns approximately 50 per cent of the outstanding stock of General Aviation Corp., which succeeds Fokker Aircraft Corp. of America, and General Aviation in turn now has a 43 per cent interest in North American.

Keim on Federal Board

DETROIT—At the annual meeting of stockholders of Federal Motor Truck Co., held here April 25 George deBiezille Keim, vice-president, was elected a director to succeed William E. Metzger, deceased.

Automotive Buying Buoy Steel Market

Operations at Highest Level — Third Quarter Takings May Cost More

NEW YORK—Accelerated buying by automotive consumers has been admittedly the outstanding factor in changing the picture of the steel market this week from one of disappointments in spite of recovery of lost ground since the "bank holiday" to the year's highest activity with a return to normal following the many months of subnormal operations measurably nearer. Most of the improvement came before the possibility of inflation in the commodity markets had had much sway on buyers' minds.

There is talk of impending mark-ups in prices of a number of finished steel descriptions, but these, as for instance, that of a planned advance of \$2 @ \$3 a ton in the strip-steel market, are explained on the basis of prices for certain kinds of finished steel having for a long time been out of line with others and with basic materials. In some quarters it is thought that, although quotations may be revised upward, consumers will actually not have to pay any more for their steel than they do now until they come to cover their third quarter requirements.

Some descriptions of sheets have been due for a rise for a long while and some rollers, especially Middle West "independents," plan early upward revision. In the Cleveland district two-thirds of the recent steel bar buying has been for automotive account and bar sales this month are the best in very nearly a year.

If the steel industry can further lift the prevailing demand by about 20 per cent, it can make both ends meet. If it can raise it by 40 per cent, the majority of the producers will be able to earn profits for their stockholders. So that it may be assumed nothing will be done to drive buyers out of the market by unnecessary or premature price advances. Like all other commodity markets, however, the steel market is bound to be under the influence of whatever readjustment in the purchasing power of money will take place.

Pig Iron—Automotive foundries are no exception from the general run of buyers who habitually turn their backs on a stationary or drooping market, but jump in when prices are in the ascendant. There has been quite a little covering this week on the basis of \$15 for malleable and No. 2 foundry, Cleveland furnace. Valley prices range from \$14.50 upwards.

Aluminum—An advance of 1c per pound is noted in prices for most grades of secondary metal, especially so for No. 12 alloy. The price for virgin aluminum remains unchanged.

Copper—Prices for a number of copper products have been moved upward to be in line with the market for the metal which early this week held firm at 6½c, delivered Connecticut point.

Federal Reserve Indexes

	Mar., 1933	Feb., 1933	Mar., 1932
Industrial			
Production ..60*	64	67	
Automotive			
Production ..27*	33	28	
Automotive			
Employment .42	49	61	
Automotive			
Payrolls27	32	51	

All indexes are adjusted for seasonal variation except payrolls.
*Preliminary.

G. V. Orr Named Plymouth Pacific Coast Manager

DETROIT—G. V. Orr, former Willys-Overland vice-president, has been appointed regional manager for the Pacific Coast territory for Plymouth Motor Corp., according to H. G. Moock, general sales manager. Regional manager for Plymouth on the Coast is a newly created position, and completes Plymouth's recent expansion in its field organization. Mr. Orr has been a retail salesman, a distributor, and a regional manager.

He will have supervision over sales and sales promotional activities in California, Oregon, Washington, Utah, Idaho, Montana and Arizona. His headquarters will be at the Chrysler Motors plant in Los Angeles.

Hupp Reports Sales Gains

DETROIT—Hupp Motor Car Corp. reports that shipments for the week ended April 22 were 13 per cent greater than for the previous week. During the first 22 days of April compared with the same period of March, shipments show an increase of 165 per cent. Shipments and unfilled orders for the first 22 days of the month against shipments and unfilled orders in the first 22 days of March show an increase of 52 per cent. Actual deliveries to owners for the four weeks ended April 22, compared with the four weeks ended March 22, show an increase of 29 per cent. April deliveries are forecast as being greater than for any previous month since June, 1932.

Studebaker Enters Five Cars at Indianapolis

INDIANAPOLIS—Studebaker has entered a five-car team in the Memorial Day 500-Mile Race, according to a Speedway announcement. The Studebakers, it is reported, will be more fully streamlined than any cars previously competing.

Kaufmann to Manage Chrysler Exhibit

DETROIT—Chrysler's exhibit at the Chicago Century of Progress Exposition will be in charge of H. A. Kaufmann, director of service. During his absence the service department will be under W. A. Hilman, service manager.

S. W. Munroe has been appointed director of sales of the Chrysler Sales Corp., succeeding C. S. Jacobson, who becomes president of the Chrysler Detroit Co., local Chrysler distributor. S. D. Briggs, former president of Chrysler Detroit, has been named Chicago district manager. F. C. Himmelman, manager of wholesale sales promotion for Chrysler Sales, now has charge of retail sales promotion as well with the transfer of H. M. Hamilton to the advertising and sales promotion section of Plymouth.

Hudson Plant on Full Time Basis

DETROIT—Hudson Motor Car Co. has reported that the regular working schedule for their plant now calls for full time or 5½ nine-hour days per week. The commercial car department, which is in production on the company's new line of light-delivery trucks, is regularly working six days per week, to speed sample shipments and orders. Domestic orders on hand as of April 20, totaled 2512 passenger cars scheduled for immediate delivery and 426 orders for export. April retail deliveries so far reported by Hudson-Essex dealers give every assurance of making the month's business the largest April volume since 1931.

Hardware Age Absorbs Good Hardware

NEW YORK—Hardware Age, one of the business publications of the United Publishers Corp. group which includes AUTOMOTIVE INDUSTRIES, Automobile Trade Journal, Commercial Car Journal, Iron Age and several others, has absorbed Good Hardware, published for the past 12 years by the Butterick Publishing Co. Hardware Age is the oldest hardware journal in the United States and during its 78 years has absorbed, besides Good Hardware, The Hardware Dealers Magazine, Hardware Reporter, Western Hardware Journal and Hardware Salesman.

Graham Stock Change

DETROIT, April 27—Graham stockholders are to vote tomorrow on a proposed change in the authorized \$1 par common from 2,500,000 to 850,000 shares. One share of new stock would be issued for each share of the old.

Canadian Sales Show Gain Over Last Year

TORONTO—Retail sales of new passenger automobiles in the Province of Ontario during the month of March were 6.2 per cent higher than in the corresponding month of 1932, according to an independent compilation of trade statistics. Total sales throughout Eastern Canada were well maintained.

For the Eastern Provinces of Ontario, Quebec and the Maritimes, Chevrolet continued to hold its leading position in sales for the third consecutive month with a total of 878 while Ford replaced Dodge for second place in March with a total of 530 sales against 244 for Dodge. Pontiac was fourth with 229 sales, while Plymouth was fifth in the list with 186 registrations.

The three leading manufacturers, General Motors, Chrysler and Ford, accounted for 88 per cent of all sales

during the month, the respective percentages being 48, 20.5 and 19.4. Sales in Eastern Canada by leading manufacturers for March were:

General Motors, 1309; Chrysler Corp., 559; Ford of Canada, 532; Studebaker Corp., 88; Willys-Overland, 77; Hudson-Essex, 73; Dominion Motors, 49. Lines made by Dominion Motors include the Frontenac, Reo, Rugby and Continental.

Would Exempt Tools From Canadian Sales Tax Levy

TORONTO — On behalf of the metal working industries, the Canadian Manufacturers' Association is making presentations to the Minister of Finance to have the sales tax removed from expense materials used in manufacturing, it is reported. Prior to the recent budget these items, which include tools, dies, drills, etc., used in the manufacturing were not

subject to sales tax along with raw materials used in manufacture. While raw materials are not now subject to tax, it has been extended to cover these expense materials. Practically all industries are interested in this application of the sales tax as dies, tools, drills, etc., are generally used in industry and this sales tax adds 6 per cent to the cost of these articles. The heavy metal industries, particularly the automotive industry, are more vitally interested than many others owing to the large amount of these articles which they use throughout the year.

Yellow Acceptance Increases Profit

DETROIT — Yellow Mfg. Acceptance Corp., controlled by the Yellow Truck & Coach Mfg. Co., in 1932 earned a net income of \$636,075 after interest as compared with \$626,151 in 1931.

Automotive Oddities—By Pete Keenan

Write us if you know an Oddity

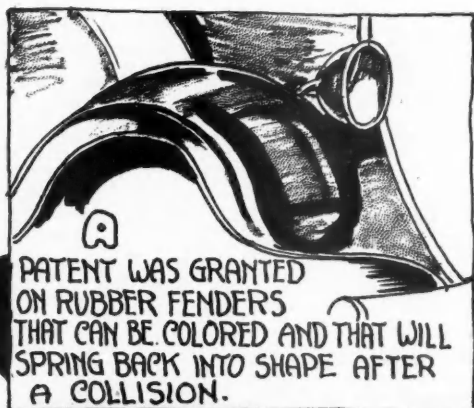


CAPT CAMERON

HAS BEEN THROUGH ALL THE HAZARDS OF THE SEA FOR OVER 50 YEARS YET IS SCARED TO DEATH OF AN AUTOMOBILE.



CHINESE FIRM INFRINGING THE EDISON PATENT CLAIMED THE BULB WAS INVENTED BY A CHINAMAN NAMED EDDI-SAN.



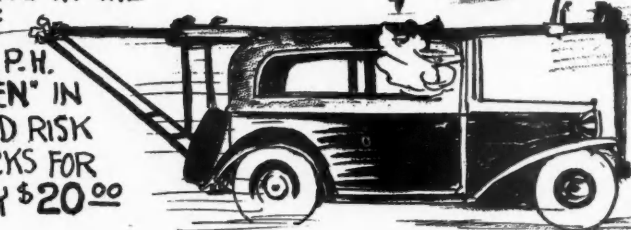
PATENT WAS GRANTED ON RUBBER FENDERS THAT CAN BE COLORED AND THAT WILL SPRING BACK INTO SHAPE AFTER A COLLISION.



THOMAS DOYLE WAS INJURED WHILE SAILING ON WATER BY AN AUTOMOBILE.

A PART FLEW OFF A CAR CROSSING A BRIDGE AND KNOCKED HIM OUT.

CHANGING AT THE SPEED OF 80 MILES P.H. "STUNT MEN" IN HOLLYWOOD RISK THEIR NECKS FOR A PALTRY \$20.00



Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

Business in practically all lines showed some betterment during last week. The improvement, however, has been generally moderate, excepting in the more speculative lines. The security and commodity markets were very active, with the stock exchange resembling the boom days of the bull market in 1928 and 1929. There have been many encouraging factors on which an upward turn in prices might be based; but, for the most part, the sudden spurt in activity in stock and commodity markets has been caused by the inflationary threat contained in recent legislation.

The Guaranty Trust Company's preliminary index of business activity for March stood at 53.4, as against 55.9 for the preceding month and 63.6 a year ago. The company's index of business activity on April 15 stood at 35.8, as against 35.3 a month earlier and 38.8 a year earlier.

Freight Gains in Week

Railway freight loadings during the week ended April 15 totaled 494,215 cars, which marks an increase of 6919 cars above those during the preceding week, but a decrease of 72,611 cars below those a year ago and a decrease of 265,279 cars below those two years ago.

Retail Sales Under 1932

Department store sales during the first half of April in the metropolitan area of New

York were 5.7 per cent below those during the corresponding period last year.

Construction Off

Construction contracts awarded in 37 eastern states during March, according to the F. W. Dodge Corporation, amounted to \$59,958,500, as against \$112,234,500 a year ago. The total for the first quarter of this year was \$196,026,800, as against \$286,078,700 in the corresponding period last year.

Exports during March amounted to \$108,000,000, as against \$154,876,000 a year ago. Imports totaled \$95,000,000, as against \$131,189,000.

Commodities Up

Professor Fisher's index of wholesale commodity prices for the week ended April 22 stood at 57.1, the highest since Jan. 14, 1933, as against 56.8 the week before and 56.2 two weeks before.

Reserve Ratio Higher

The consolidated statement of the Federal Reserve banks for the week ended April 19 showed decreases of \$14,000,000 in holdings of discounted bills and of \$39,000,000 in holdings of bills bought in the open market. Holdings of Government securities remained unchanged. The reserve ratio on April 16 was 61.5 per cent, as against 60.6 per cent a week earlier and 59.7 per cent two weeks earlier.

Chrysler First Quarter Deficit is \$3,038,082

Big Reserve Additions Make Loss Bigger Than Last Year But Operating Loss is Less

DETROIT — While the Chrysler Corp. and subsidiaries report net loss of \$3,038,082 for the first quarter of 1933 against a loss of \$2,066,485 in the corresponding 1932 quarter, analysis of the statement indicates that the operating loss in the first three months of this year was less than a year ago. An addition of about \$1,500,000 to the reserve for contingencies accounts for about one-half of the first quarter loss and, if deducted, makes the operating loss for the period about \$500,000 under the first quarter last year. Presumably this large addition to the company's reserves was made to take care of possible loss on funds amounting to \$6,520,504 tied up in closed or restricted banks.

Current assets at the end of the quarter totaled \$54,342,716 and included cash and securities of \$32,185,536, exclusive of funds tied up in banks. Current liabilities were \$11,035,348, leaving working capital of \$43,307,368, as compared with \$49,286,416 at the end of 1932, the reduction being less than the \$6,520,504 tied up in banks.

Unit sales during the quarter numbered 57,861 against 55,704 in the first quarter of last year, a gain of 4 per cent, and representing more than a fifth of the entire industry's sales for the period. Dollar volume on the other hand declined to \$33,059,489 from \$37,368,443 last year, a decrease of 11.6 per cent. These changes reflect a decrease in the sales income per unit from \$671 last year to \$572 this year. Ratio of gross profit to sales was 11.8 per cent in 1932 as compared to 11.4 per cent this year. Expenses for the quarter were cut 22.5 per cent from last year to \$4,766,189.

Custom Car Market Enjoying Come Back

BUFFALO — Concrete evidence that many people, in the guise of thrift, have practiced unwarranted self-denial beyond the limit of their endurance, is found in the steadily increasing proportion of automobile buyers who are returning to the fine custom car market, according to a statement by Roy H. Faulkner, Pierce-Arrow's vice-president in charge of sales. Substantiation of this statement is offered in the announcement that Pierce-Arrow, in the first three months of this year, has sold more custom cars—more cars priced above \$4000 than that company sold in the corresponding period of 1932.

New Iso-Vis D Oil Sells for 5 Cents Less

CHICAGO—Standard of Indiana is introducing a new motor oil in the production of which two recently developed refining processes are applied. These are known as propane dewaxing and chlorex extraction. In the first, complete dewaxing of the oils is accomplished by dissolving them in liquefied petroleum gases under high pressure. In the second, the undesirable fractions of the motor-oil base stock are dissolved out, leaving only the choice fractions. The resulting oil is claimed to exhibit ex-

ceptional resistance to heat and cold, as well as to oxidation, and consequently has unusual lasting qualities. It is said to be virtually free from any tendency to develop sludge and it will be known as Iso-Vis D, to distinguish it from the Iso-Vis previously sold. The price will be five cents a quart less.

Graham Reports Loss

DETROIT—A net loss of \$86,696 is reported by Graham-Paige for the first quarter of 1933 as compared with a net profit of \$166,589 in the corresponding quarter of 1932.

New Voluntary Chain Organization Started

I.C.S. Starts Activities in Allentown, Pa., Area

NEW YORK—Independent Certified Stores Service Corp. has been formed to act as organizers of voluntary chains for automotive wholesalers, with headquarters at 1819 Broadway.

I.C.S. headquarters, in association with selected auto accessory wholesalers, will perform the functions of merchandising, research, buying, advertising, store layout, window display, and sales training for its independent retail members. The general manager of the new organization is A. Lusher, who has been associated with such well-known companies as Motor Car Equipment Co., 35% Auto Supply Co., Times Square Stores, G. J. Seedman Co., Economy Auto Supply Co., and more recently has been active in getting independent auto accessory stores functioning in a voluntary chain.

The I.C.S. has already started to organize a voluntary chain of stores in the Allentown, Pa., district working in cooperation with the Philadelphia Motor Accessories Co. of Philadelphia. Additional chains will shortly be organized in Massachusetts, Connecticut and Rhode Island, I.C.S. says.

Twin Coach Earns \$78,229

KENT, O.—The Twin Coach Co. reports for the first quarter of 1933 a net profit after all charges, including depreciation, but before provision for federal income taxes, of \$78,228.53, compared with a net profit for a corresponding period of last year of \$50,280.36.

Campbell-Ewald Gets Advertising Awards

DETROIT—Campbell-Ewald Co. at the 12th annual exhibition of advertising art in New York, which opened April 11, earned the high distinction of tying for first place in the number of art pieces selected for exhibit. Nineteen pieces were selected from this agency out of a total of 170 from all sections of the country, and it is believed that this is the first time that a mid-western agency ever achieved this honor.

One of the selections won one of the seven medals awarded for the best art in seven classifications, this honor going to Cadillac Motor Car Co. in the black and white photographs section. Incidentally, 12 of the 19 exhibits selected from this agency were for the Cadillac Motor Car Co.—the greatest number selected from any company represented in this exhibit.

Others selected included two each from the United States Rubber Products, Fisher Body and Chevrolet, and one from Pontiac. This exhibit is sponsored yearly by the Art Directors Club of New York and will close on May 6.

Sheffield Ownership Changes

DAYTON, OHIO—A majority stock interest and control of The Sheffield Machine & Tool Co., precision gage maker of this city, has been acquired by interests identified with City Machine & Tool Works of the same city.

C. H. Reynolds of Detroit, Mich., long associated with both the Cincinnati and Sheffield organizations, becomes president of the latter. O. M. Poock, president of City Machine & Tool Works, becomes treasurer, while Louis Poock, general manager of City Machine & Tool Works, becomes vice-president and general manager, of The Sheffield Machine & Tool Co.

Mrs. Theresa Ewald

DETROIT — Mrs. Theresa Ewald, mother of Henry T. Ewald, president of Campbell-Ewald Co., died recently at her home, following an illness of four weeks.

CALENDAR OF COMING EVENTS

MEETINGS

U. S. Chamber of Commerce Meeting, Washington, D. C.	May 2-5
American Gear Mfg. Assoc., Wilkesburg, Pa.	May 4-6
Natl. Automobile Chamber of Commerce, Annual, New York City	June 8
Natl. Retail Hardware Assoc., Indianapolis	June 12-16
A.S.M.E. Natl. Aeronautic Meeting, Chicago	June 26-27
American Society for Testing Materials, Chicago	June 26-30
Automotive Engine Rebuilders Assoc., Annual, Chicago	July 10-14
International Automotive Engineering Congress of the S.A.E., Chicago	Aug. 28-Sept. 4
American Chemical Society, Chicago	Sept. 11-15
American Transit Assoc., Chicago	Sept. 18-20
Natl. Safety Council, Chicago	Oct. 2-6
National Metal Congress, Detroit	Oct. 2-6
American Petroleum Institute, Annual, Chicago	Oct. 24-26

SECTION MEETINGS—S. A. E.

Baltimore	May 18
Canadian	May 17
Cleveland	May 18
Metropolitan	May 18
Milwaukee	May 3
New England	May 10
Northern California	May 9
Northwest	May 5
Oregon	May 5
Philadelphia	May 10
Pittsburgh	May 11
Southern California	May 19
Washington	May 17

RACES

Indianapolis Race	May 30
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Royce, Famous British Engineer, Dies at 70

Developed Rolls-Royce Car and Plane Engines

Sir Henry Royce, one of the world's foremost automobile engineers and engine designers, died at his home in Sussex, England, on April 22, at the age of 70. He was the mechanical genius of the firm of Rolls-Royce, Ltd., and was responsible not only for the development of the Rolls-Royce car but also for a series of aircraft engines, including that used in Campbell's Blue Bird, which were among the most successful on the allied side during the war and later on enabled England to win world's speed championships on land, in the air and on the water. A baronetcy was granted to him in 1930, shortly after the Schneider cup race had been won with a plane powered by a Rolls-Royce engine.

Henry Royce started out in life as a London newsboy at the age of 9 following the death of his father. He was compelled to leave school at the age of 11, after only three years of primary education. He then went to work delivering telegrams for the Post Office, which controls the telegraph service in England. During off hours and also between messages he studied electricity and when 14 years old he entered upon an apprenticeship in the electrical shops of the Great Western Railroad. At 17 he secured employment in a machine-tool works and at 19 he was made chief electrician for a company which installed the first electric light plant in Liverpool. This venture failed and Royce, at the age of 21, established himself in business under the style of Royce, Ltd., manufacturing arc lamps and small electric generators. This firm continues in business today.

During the early years of the present century Royce bought himself an automobile for use in his business, and its many shortcomings induced him to build a car of his own. This was brought to the attention of the Hon. C. S. Rolls, who was among the first automobile enthusiasts in Great Britain and who had been looking for a chance to enter the rapidly developing automobile business. Royce's first car was a two-cylinder of 10 hp. The firm of Rolls-Royce, Ltd., was formed and originally was established at Manchester, but it soon outgrew its quarters there and then built a new plant in Derby, into which it moved in 1908.

Royce lost his partner after only a few years, the Hon. C. S. Rolls being killed in an aircraft accident in 1910.

Young Earnings Gain

DETROIT—L. A. Young Spring and Wire Corp. in the quarter ended March 31, earned \$8444 after charges as compared with \$5773 in the first quarter of last year.

Picking

THE ONE STAINLESS STEEL THAT BEST MEETS YOUR NEEDS

In this day when public demand for stainless steel has become so insistent, manufacturers are faced with the task of selecting from the many types of Stainless Steel, the one most ideally suited to specific needs.

Such selection involves consideration of the variation in corrosion resistant characteristics of the various types as well as careful analysis of the physical characteristics as to strength and workability.

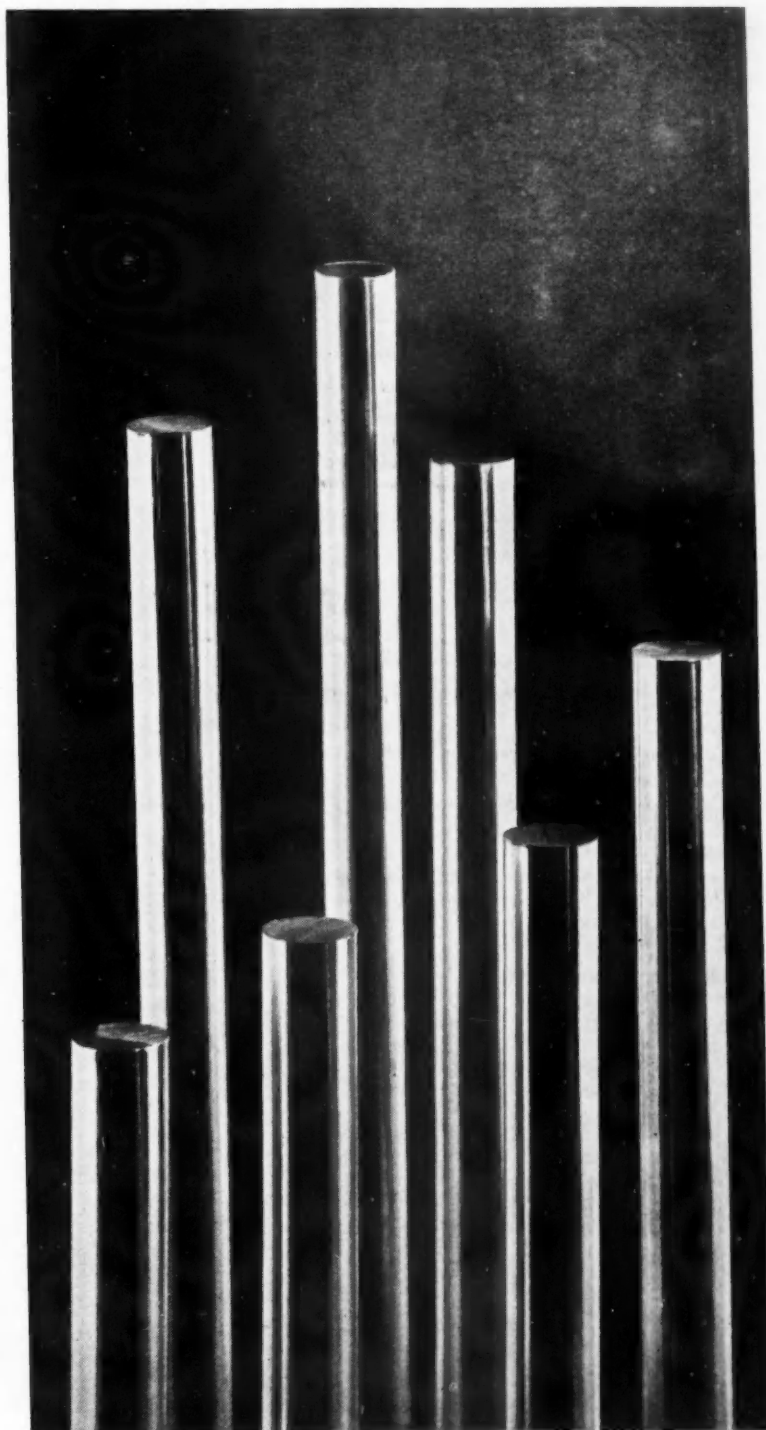
Our metallurgists will be glad to work with you in the necessary studies and in specifying the ideal (USS) Stainless (and Heat Resisting) Steel for your requirements.

Illinois Steel Company
CHICAGO, ILLINOIS



CARNEGIE STEEL COMPANY
PITTSBURGH, PA.

SUBSIDIARIES OF
UNITED STATES STEEL CORPORATION



USS 17 for a Wide Range of Applications

USS 17 is entirely permanent in ordinary atmosphere provided the surface is well polished and free from foreign particles. No special heat-treatment is necessary to assure its retention of corrosion resistance.

It is ductile and malleable, though less suitable than USS 18-8 for severe forming operations.

It may be used with impunity at con-

tinuous temperatures as high as 1550 degrees F. It is not much affected by moderate sulphur content in gases at high temperature and is not subject to intergranular attack.

Other grades of USS Stainless and Heat Resisting Steels are:

USS 18-8 USS 18-12
USS 12 and 12Z USS 25-12
USS 27

USS

STAINLESS AND HEAT RESISTING STEELS

U S S CHROMIUM-NICKEL ALLOY STEELS ARE PRODUCED UNDER LICENSES OF THE CHEMICAL FOUNDATION, INC., NEW YORK, AND FRIED. KRUPP A. G. OF GERMANY

Automotive Industries

April 29, 1933

Greenlee
BROS. & CO. 
ROCKFORD, ILLINOIS, U. S. A.
MULTIPLE SPINDLE DRILLING AND TAPPING MACHINES.
AUTOMATIC SCREW MACHINES. SPECIAL MACHINERY

PIG IRON SEMIFINISHED STEEL BARS & SHAPES  SKELP SHEETS PIPE SPECIALTIES
ENDURO-REPUBLIC'S PERFECTED STAINLESS STEEL
AGATHON ALLOY STEELS
REPUBLIC STEEL CORP.
YOUNGSTOWN, OHIO

DIAMOND Vulcanized Fibre
Sheets, rods, tubes, washers and special shapes, to meet every insulating need
Also CELORON Timing Gears and DILECTO.
CONTINENTAL-DIAMOND FIBRE CO.
Newark, Delaware

CHAMBERSBURG-NATIONAL
COMPLETE FORGING EQUIPMENT
CHAMBERSBURG ENGINEERING CO. THE NATIONAL MACHINERY CO.
CHAMBERSBURG, PA. TIFFIN, OHIO
Sales Offices
NEW YORK, 152 W. 42nd St. CHICAGO, 565 W. Washington St.
DETROIT, 2457 Woodward Ave.

BUYERS' GUIDE

Automotive Products and Factory Equipment Manufactured by Advertisers in This Issue

See Alphabetical List of Advertisers on Page 39

This Advertiser's Index is published as a convenience, and not as part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert.

Bearings, Anti-Friction <i>Roller</i> Hyatt Roller Bearing Co.	Channels for Glass <i>Felt</i> American Felt Co.	Fibre, Rods, Sheets, Tubes Continental-Diamond Fibre Co.	Heaters, Car Stewart-Warner Corp.	<i>Turret</i> Potter & Johnston Machine Co.
Bending & Straightening Machines Chambersburg Engineering Co. Chambersburg-National Co. National Machinery Co.	Cleaners <i>Metal</i> American Chemical Paint Co. (Rust Preventive)	Furnaces, Electric (Annealing, Carburizing, Heat Treating, Forging & Welding) Electric Furnace Co.	Heat Treating Barnes-Gibson-Raymond, Inc. Barnes Co., Wallace Gibson Co., Wm. D.	Molded or Machined Parts (Phenolic) Continental-Diamond Fibre Co. Genl. Elec. Co. (Plastics Dept.)
Boring Machines Foote-Burt Co.	Dashes, Truck Stolper Steel Products Corp.	Gaskets <i>Felt</i> American Felt Co.	Hoods Stolper Steel Products Corp.	Motors, Electric Power General Elec. Co.
Brakes <i>Mechanical</i> Stewart-Warner Corp. <i>Power</i> Stewart-Warner Corp.	Drilling Machines Foote-Burt Co. Greenlee Brothers and Co. (Multiple Spindle)	Gear Material <i>Non-Metallic</i> Continental-Diamond Fibre Co. Genl. Elec. Co. (Plastics Dept.)	Hose, Flexible Metallic (Radiator & Fuel Lines) Titeflex Metal Hose Co.	Oils, Cutting & Lubricating Sun Oil Co.
Bumpers Stewart-Warner Corp.	Enamels American Chemical Paint Co. (Rust Proofing)	Gears, Timing <i>Non-Metallic</i> Continental-Diamond Fibre Co. Genl. Elec. Co. (Plastics Dept.)	Insulating Material Continental-Diamond Fibre Co. Genl. Elec. Co. (Plastics Dept.)	Pads <i>Felt</i> American Felt Co.
Bushings <i>Fibre</i> Continental-Diamond Fibre Co.	Felt American Felt Co.	Hammers, Power Chambersburg Engineering Co. Chambersburg-National Co. National Machinery Co.	Lamps Genl. Elec. Vapor Lamp Co.	Paints American Chemical Paint Co. (Heat Resisting)
Cable <i>Brake or Cut Out Control</i> Amer. Steel & Wire Co. <i>Ignition, Starting and Lighting</i> Amer. Steel & Wire Co.	Fenders Stolper Steel Products Corp.		Lathes <i>Automatic Chucking</i> Potter & Johnston Machine Co.	Pickling Compounds American Chemical Paint Co.
				Plugs, Expansion Hubbard Spring Co., M. D. (Continued on page 38)

April 29, 1933

Automotive Industries




STAINLESS and Heat Resisting ALLOY STEELS

U S S Chromium-Nickel Alloy Steels are produced under licenses of the Chemical Foundation, Inc., New York, and Fried. Krupp A. G. of Germany.

HERE TODAY AND HERE TOMORROW

The future of every fabricator of a metal product is determined—more or less—on how he counteracts the forces of metallic corrosion.

The use of U S S Chromium and Chromium Nickel Alloy Steel adds so little to unit cost and delivers so much more in endurance and beauty that many fabricators are now using these alloys in forming parts specified by the country's leading architects, designers and engineers . . . We are able to furnish you, first—authoritative information on the U S S analyses—second, cold rolled strip steel, wire and wire products. Let us send you our literature on this subject.

1831  1933

AMERICAN STEEL & WIRE COMPANY

208 South LaSalle Street, Chicago
94 Grove Street, Worcester

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

Empire State Bldg., New York
First National Bank Bldg., Baltimore

Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco

AND ALL PRINCIPAL CITIES

Export Distributors: United States Steel Products Company, New York

TANKS HOODS FENDERS

We are now supplying both stamped and fabricated automotive products, to specifications, for automotive manufacturers—easily meeting fluctuating production schedules—and supplying the finest quality of merchandise. We will gladly estimate on your requirements.

Stolper Steel Products Corporation
3310 Fond du Lac Ave., Milwaukee, Wis.

DEOXIDINE—
Prepares Auto Bodies for
Painting

RODINE—
Pickling Bath Control

STRIPPLE
High Speed Enamel Remover

AMERICAN CHEMICAL PAINT CO.
AMBLER, PENNA.

PEROLINE—
Rust Preventing Oil

KEMICK—
Manifold Paint

FLOSOL—
Soldering Flux

PARADOX—
Rust Proofing Enamel



FELT

AMERICAN FELT CO.
NEW YORK DETROIT CHICAGO

STAMPINGS



QUALITY
STAMPINGS

Heavy, medium and light stampings in any quantity. A steady flow of production—when you want it.

WORCESTER STAMPED METAL CO.
Worcester, Mass.



QUALITY
STAMPINGS

*A*UTOMOTIVE INDUSTRIES is read each week by general executives, production men, engineers, purchasing agents and others whose o.k. means orders for those who sell to The World's Largest Manufacturing Industry.

BUYERS' GUIDE—Continued

(Continued from page 36)

Presses	Special Machinery	Steel	Tanks	Lock
Chambersburg Engineering Co. Chambersburg-National Co. National Machinery Co.	Greenlee Brothers & Co.	<i>Alloy</i>	Stolper Steel Products Corp.	Shakeproof Lock Washer Mfg. Co.
Removers, Enamel & Paint	Speedometers & Tachometers	<i>Bars</i>	Tapping Machines	<i>Plain Metal</i>
American Chemical Paint Co.	Stewart-Warner Corp.	Illinois Steel Co. Republic Steel Corp.	Foot-Burt Co. Greenlee Brothers & Co.	Hubbard Spring Co., M. D.
Rust Removers & Preventives	Springs	<i>Billets</i>	Tools, Cylinder Honing	Welders, Electric
American Chemical Paint Co.	<i>Extension, Compression Torsion or Flat</i>	Illinois Steel Co.	Micromatic Hone Corp.	General Elec. Co.
Schools, Engineering	<i>Amer. Steel & Wire Co. Barnes-Gibson-Raymond, Inc. Barnes Co., Wallace Cook Spring Co. Gibson Co., Wm. D. Hubbard Spring Co., M. D. Raymond Mfg. Co.</i>	<i>Carbon</i>	Tools, Cylinder Honing	Welding Material
Hemphill Diesel Engrg. Schools	<i>Valve</i>	Republic Steel Corp. Illinois Steel Co.	Tools, Cylinder Honing	Amer. Steel & Wire Co. (Wires & Electrodes)
Screw Machine Products	Stampings or Drawings, Metal	<i>Cold Drawn</i>	Tubing	Wicks
Barnes Co., Wallace	Barnes-Gibson-Raymond, Inc. Barnes Co., Wallace Cook Spring Co. Gibson Co., Wm. D. Hubbard Spring Co., M. D. Raymond Mfg. Co.	Amer. Steel & Wire Co. Republic Steel Corp.	<i>Flexible Metal</i>	<i>Felt</i>
Screw Machines	Steam Cooling	<i>Electric Furnaces</i>	<i>Titeflex Metal Hose Co.</i>	American Felt Co.
Greenlee Brothers & Co. Potter & Johnston Machine Co.	Rushmore Laboratory	Illinois Steel Co.	Turret Machines, Automatic	Windshield Wipers
Shock Absorbers		<i>Shapes</i>	Potter & Johnston Machine Co.	Stewart-Warner Corp.
Stewart-Warner Corp. John Warren Watson Co.		<i>Spring</i>	Vacuum Tanks	Wire
		Barnes-Gibson-Raymond, Inc. Barnes Co., Wallace Gibson Co., Wm. D.	Stewart-Warner Corp.	<i>Flat, Round, Square or Special Shape</i>
		<i>Stainless</i>	Washers	Amer. Steel & Wire Co. Barnes Co., Wallace
		Amer. Steel & Wire Co. Illinois Steel Co. Republic Steel Corp.	<i>Felt</i>	<i>Spring</i>
		<i>Strip</i>	American Felt Co.	Amer. Steel & Wire Co. Barnes Co., Wallace Republic Steel Corp.
		Amer. Steel & Wire Co. Illinois Steel Co. Republic Steel Corp.		
		Tank Support Straps		
		Stolper Steel Products Corp.		

April 29, 1933

Automotive Industries

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BIG PAY DIESEL JOBS

The Hemphill Home Study Course which includes Practical Shop Training in the famous Hemphill Schools prepares You for Big Pay Diesel Jobs—employers depend on us for Diesel Engineers. You learn quickly. Many successful graduates. Write Today for our Free Illustrated booklet—"Big Pay Diesel Opportunities."

Hemphill Diesel Engineering Schools

2129 San Fernando Rd., Los Angeles, Cal.

509 Westlake North, Seattle, Wash.

To shorten your Diesel Training period you may take your full Diesel Course in one of the Hemphill Schools. This plan eliminates Home Study lessons but requires daily attendance at one of our Schools.

MEN NEEDED To Operate DIESEL—

Trucks
Busses
Generating
Plants
Marine
Engines
Locomotives
Airplanes
Power Shovels
Tractors
Ice Plants
Pumping
Plants
MANY OTHER
OPPORTUNITIES

PJ FOR OVER **PJ**
A QUARTER OF
A CENTURY

THE PIONEER
MANUFACTURER OF
AUTOMATIC CHUCKING
EQUIPMENT

POTTER & JOHNSTON MACH. CO.
PAWTUCKET, R. I., U. S. A.

Steam
Cooling
PRACTICALLY ELIMINATES
CRANKCASE DILUTION

Rushmore Laboratory

PLAINFIELD • NEW JERSEY

EXPANSION PLUGS



FOR CLOSING CORE HOLES

COILED and FLAT SPRINGS

PHOSPHOR BRONZE SPRINGS A SPECIALTY

SMALL STAMPINGS

WASHERS and SPRING COTTERS

WIRE SHAPES

M. D. HUBBARD SPRING CO.

620 SOUTH BLVD.

PONTIAC, MICHIGAN

Metal working plants today more than ever... need COOPER HEWITT LIGHT

MODERN INDUSTRY DEMANDS COOPER HEWITT LIGHTING

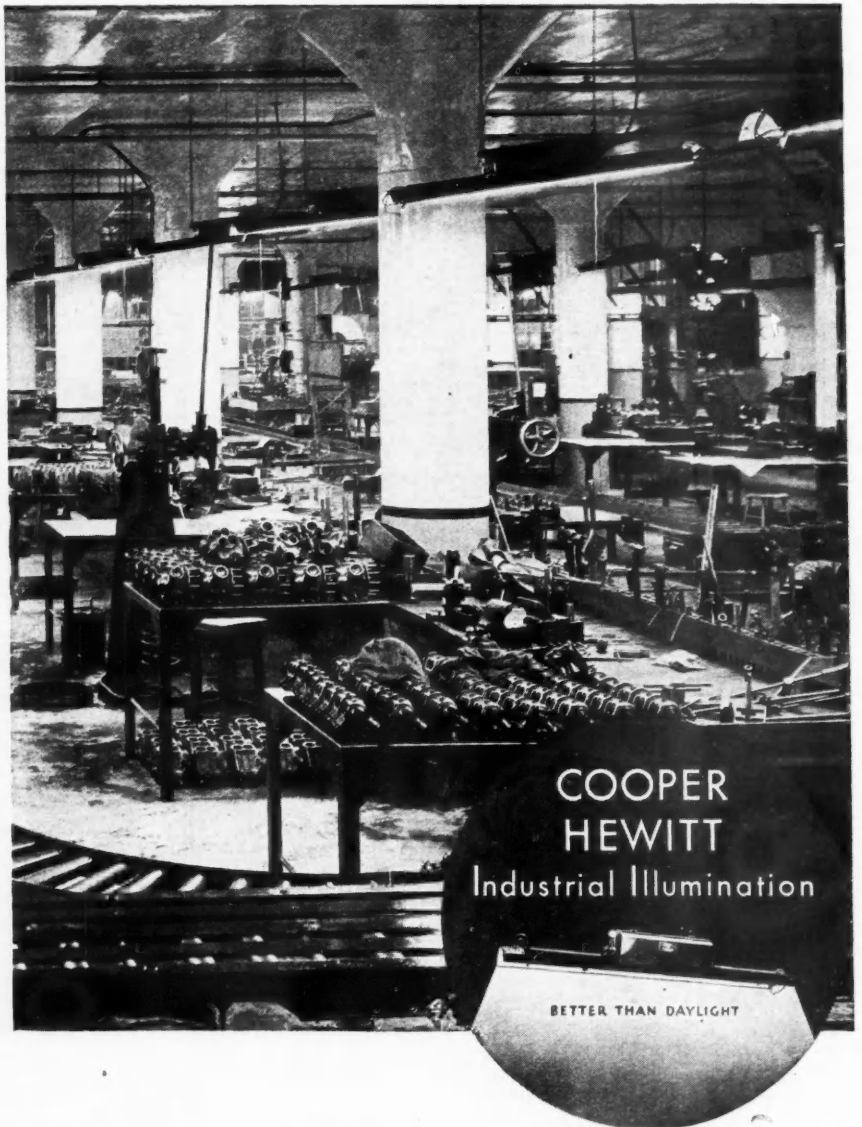
● Existing industrial conditions make it of primary importance that products be made at the lowest possible cost without sacrifice in quality. It makes no difference what you manufacture—automobiles, cotter pins, gadgets or dingbats.

● Such times bring Cooper Hewitt light into its own. One after another industrial plants are turning to this highly economical illumination. Mercury-vapor light quickly proves itself above all competition—not excluding daylight.

● For example, one metal working concern already using over 2,000 Cooper Hewitt lamps, recently consolidated in one plant the production machinery taken from two others which they closed. Over five hundred Cooper Hewitts were added.

● Another concern consolidated its production machinery and made other changes—investing \$250,000 and saving more than \$1,000,000. As an essential to the success of the newly adopted economy plan over 150 Cooper Hewitt lamps were added to the large installation already existing.

● Any representative of this company will gladly acquaint you with the advantages which accrue to users of Cooper Hewitt light. A post-card to this address will bring prompt action: General Electric Vapor Lamp Co., 801 Adams St., Hoboken, New Jersey.



COOPER
HEWITT
Industrial Illumination

BETTER THAN DAYLIGHT

GENERAL  ELECTRIC
VAPOR LAMP COMPANY

556 Copr. 1933, General Electric Vapor Lamp Co.

Reflections of Micromatic Frictionless Mirror Finish

Now produced by full automatic operation, well within the limits of commercial manufacturing costs.

A FREE CUT honed finish—no polishing or burnishing—FREE FROM FRICTIONAL HEAT.



Advantages!

Micromatic Frictionless Mirror Finish provides longer life to piston rings and cylinders . . . allows closer fit of pistons . . . prevents piston scoring and seizing . . . increases horsepower due to less friction . . . gives better compression by prevention of blowby . . . prevents ring flutter at high speeds . . . permits top speed operation with new motors.

Leading manufacturers are now using this hone. Ask us to tell you in detail concerning the excellent results they are getting.

Micromatic Hone Corporation, Detroit, Mich.

Relaxed Motoring

● Who in the Industry but remembers that famous Watson Slogan—and true? "Relaxed Motoring".

Who but remembers that firmness of ride and security of feel and peace of mind over *any* road, at *any* speed and with firmness, as well, at speeds around curves?

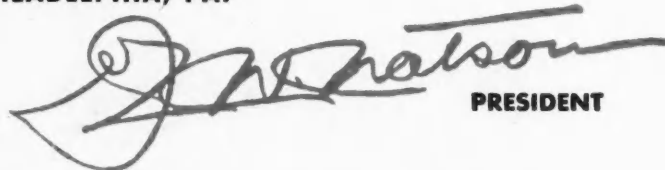
But now comes a greater Relaxed Motoring—a greater firmness, a greater feel of security, and, withal, the smoothness and softness of floating.

A paradox?

No!

You will soon know as we do that firmness and utter security can go hand in hand with softness and smoothness.

JOHN WARREN WATSON COMPANY
PHILADELPHIA, PA.


PRESIDENT

GYRO
